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Contents

	PAGE
EDITORIAL NOTES: The Trade Position; Dyestuffs Act Repeal Proposal; Acid Handling Methods; Pure Carbon Monoxide; Dr. Ruttan's Visit	335
Furnishing and Equipment of Laboratories	338
Correspondence: An Author's Inquiry; British-made Dyes; Gold Metallurgy of the Witwatersrand	340
Movement to Repeal the Dyestuffs Act	341
Cold Vulcanisation of Rubber	342
Death of Lord Manton; Institution of Petroleum Technologists	343
The Properties of Powders	344
Collapse of "Tennant's Stalk"; Chemistry of Gasworks Refractories	345
Chemical Aspects of Cement	346
British Chemical Porcelain	347
Chemical Exhibits at the British Industries Fair: An Impression by J. E. Southcombe, M.Sc.; Chemical Matters in Parliament	349
From Week to Week	350
References to Current Literature	351
Patent Literature	352
Market Report and Current Prices	355
Scottish Chemical Market	357
Manchester Chemical Trade; German Chemical Trade Notes	358
Company News; Chemical Trade Inquiries; Tariff Changes	359
Commercial Intelligence; New Companies Registered	360

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Trade Position

AN unduly pessimistic view seems to be taken in some quarters of the new Board of Trade returns. It is true that, as compared with February of 1921, imports are down over 27 millions, exports are down over 9 millions, while re-exports are up a little over 2 millions. Chemicals, drugs, dyes, and colours share in this general decline, imports showing a decrease of £613,157, and exports a decrease of £443,668. These figures, however, look substantially worse than they really are. They relate to value and not to quantities, and in estimating their meaning it is necessary to take account of the heavy fall in prices. In the case, for example, of exports of manufactured goods, the table of values gives little indication of the real state of national trade as compared with the position a year ago. While nearly every important group shows a decline in value, the quantity tables make it clear that the great staple industries of the country sent abroad far larger consignments of their products last month than in February of 1921. How this real expansion is concealed by the fall in prices may be illustrated by four examples:

	Quantity.	Value.
Iron and steel (tons):		
Feb., 1921	166,869	£7,222,559
Feb., 1922	223,616	4,665,353
Cotton piece goods (yards):		
Feb., 1921	244,725,500	16,513,263
Feb., 1922	251,954,800	9,908,197
Worsted tissues (yards):		
Feb., 1921	3,596,500	1,309,817
Feb., 1922	4,028,000	805,331
Linen piece goods (yards):		
Feb., 1921	1,930,600	414,758
Feb., 1922	7,217,900	688,841

While the figures might certainly be more encouraging, their adverse appearance must not be exaggerated. In the chemical industries, for some time past, the movement of trade has been distinctly hopeful. Slow as the recovery is, it is steady, and every forward step helps to consolidate the progress gained. Inquiries have for some time past shown a marked activity. More important still, we hear from several quarters of an increased turnover, which is the more promising because it is quietly but consistently progressive. What is wanted more than anything else is an atmosphere of real commercial confidence in which these hopeful trade tendencies may develop. The general movement, on the whole, is reassuring, but unfortunately checks occur from time to time to interrupt it.

One of the most serious is now threatened by the dispute in the engineering trade. The recent stoppage in the coal industry cost this country a heavy sum in tangible as well as in remoter and incalculable losses, and the trade unions learnt to their cost that they must accept their proportion of national losses no less than of national gains. At the moment we have something like 250,000 skilled engineers idle, in addition to a more than normal volume of unemployment. Even the densest or the most reckless labour leader must realise, not only the loss to the engineers themselves and their industry, but the secondary effects of the stoppage on other trades, and the enormous contribution which even a brief dispute on such a scale makes to our already serious industrial problems. The solution of these problems is not helped; on the contrary the burdens to be carried are inevitably increased. The general hope is that the difficulties will admit of a speedy settlement, and on both sides efforts are being made to this end. Loss is certain already to all parties. It only remains to restrict it to the narrowest dimensions, and to resume as early as possible the difficult but essential work of patient reconstruction.

Dyestuffs Act Repeal Proposal

MR. REMER'S motion in the House of Commons on Wednesday for leave to introduce a measure to repeal the Dyestuffs Act was rejected in a House of moderate size by a majority of 82. Mr. Remer occupies a curious position as the leader of the repeal agitation. He has not, he says, changed his protectionist convictions; he is still in favour of the protection of efficient industries; he accepts the principle of protection for the dyestuffs industry. But the methods of the existing Bill, he argues, are wrong, and it ought to be repealed. In these circumstances Mr. Remer is simply arguing, not against the protection of the dyestuffs industry, but in favour of a more effectual form of protection, and his own argument lays upon him the obligation of submitting *pari passu* with the repeal of the Act to which he objects the terms of a new Act which is more perfectly to attain his purpose.

Frankly we do not understand Mr. Remer's plea for the protection of "efficient" industries. A thoroughly "efficient" industry needs no protection, and the present Act is intended to run for ten years in order to give the British industry a reasonable chance of becoming efficient in this sense and consequently self-dependent. Admittedly, therefore, at present it is not perfect; it is in a comparatively early stage of development; defects and limitations there must be for a time. These, in fact, are the very conditions the Act was designed to provide for and Mr. Remer's arguments all really go to the strengthening and improvement of the Act rather than to its repeal. It is safe, however, to say that the bulk of his supporters voted for his motion on two totally different grounds—the first their general hostility to the present Government, and the second their desire to re-establish free trade in dyes. The latter policy admittedly would destroy a great part of the valuable development work already done; it would, moreover, be one of the most palpable breaches of faith in Parliamentary history.

The reply was left to Lieut.-Colonel Astbury, himself a consumer of dyes, who was able to support the Act from a considerable personal experience. He reminded the House of the central principle of German policy towards competitors—a principle it would be folly to forget. While Germany can easily undersell us in colours which we are also able to produce, for colours not produced here she is asking "extortionate" prices. There are but two courses open—either to go on developing our own dyestuff industry until it is equal to all our needs or frankly to return to the pre-war policy of dependence on Germany. There can be, from the British point of view, only one answer to such a problem, and the House of Commons gave it on Wednesday.

Acid Handling Methods

SUCH a considerable quantity of sulphuric acid is transported in tank barges and tank wagons that those who have to deal with it are apt to become a little indifferent to the fact that precaution is necessary. In this era of "safety first" principles it is well to examine at times the old familiar methods which have been handed down from the days when we were less scrupulous, and to question ourselves as to whether our methods are right merely because they may—probably due to good fortune—have stood the test of time. One does not want, of course, to over-elaborate either one's plant or one's methods of working, for it has very rightly been said that the greater the simplicity of any chemical apparatus, the more desirable it is, providing efficiency is not sacrificed to simplicity. It would seem that in America they are very much more punctilious in the attention which is given to detail in the matter of ensuring that precautions to avoid accident are taken, and so far as acid handling is concerned there are a number of helpful points in a paper which Mr. M. F. Crass presented some short while ago to the chemical section of the U.S. National Safety Council.

It is generally recognised that the unloading of acid tanks is more safely accomplished by the blowing method than by any other. By the application of 30 lb. air pressure, acid can be lifted to a height of 40 ft., which is ample in most cases to discharge the contents into an elevated storage tank. Bottom outlets are, of course, frequently made use of, but in America they have proved dangerous in that if the wagon happens to be derailed, or is subjected to anything approaching shock, the outlet frequently breaks away. These outlets, moreover, are liable to undergo considerable wear and tear, and the threads of the collar which holds the plug or outlet cock are weakened by the action of the acid. American experience, in fact, leaves no room for doubt that top-discharge by compressed air is by far the safest and most effective method. A point, the danger of which is not always appreciated, concerns the quantity of acid loaded into tank wagons. Variations in atmospheric temperature, especially in hot summer periods, tend to increase the volume of the acid through expansion. There is also further possibility of the generation of hydrogen, which directly concerns the amount of acid which should be loaded in the tank because of the space which it takes up when present. The U.S. Bureau of Explosives has pointed out that the vacant space must not be less than 2 per cent. of the total capacity of the tank, including the dome and shell capacity combined, and if the dome of the tank car does not provide this 2 per cent. sufficient vacant space must be left in the shell of the tank to make up the difference. Attention is called to another danger which is frequently encountered. Orders calling for definite tonnages sometimes result in the shipment of tank cars only partially filled. Furthermore, tank cars are sometimes supplied for loading when there may be insufficient stock to fill the tank. The result is an undue strain on the tank and tank car equipment due to swishing back and forth of the load, thus jeopardising the safety of the heads and having a tendency to break the tank loose from its anchorage and possibly shift it on the wagon body.

Pure Carbon Monoxide

THERE is still a good deal of interest in the auxiliary chemical processes which had to be worked out during the war in order that some purely wartime product might be arrived at. For instance, in the course of the development of phosgene for military purposes the Chemical Warfare Service of the American army perfected a process for manufacturing pure carbon monoxide. At Edgewood arsenal the method employed for making phosgene was the direct one of uniting

carbon monoxide and chlorine in equal molecular proportions :

$$CO+Cl_2=COCl_2$$

and, as large quantities of chlorine were available, the main problem was to secure a supply of pure carbon monoxide. This gas can, of course, be readily obtained from such products as water gas, but the large proportion of other gaseous constituents involves serious loss of efficiency. Eventually, a supply of pure CO was obtained by producing, in the first place, carbon dioxide from the combustion of coke with an excess of air. This gas was then purified by washing with water in tower scrubbers, dust and sulphur dioxide being removed. To eliminate the nitrogen introduced from the original air, the gases coming from the first scrubbing tower were passed through a series of towers wherein they came in contact with a cold, 11 per cent. solution of potassium carbonate, which absorbed the carbon dioxide, forming potassium bicarbonate. The bicarbonate solution was then run to a boiler, where it was heated by steam, and the pure CO_2 was released. Carbon monoxide was then produced from the dioxide.

The conversion of the dioxide into the monoxide is accomplished by the use of incandescent coke, which is obtained by burning in an air current. When the coke mass has reached a temperature of about 1,300°C. the air is shut off and carbon dioxide turned on. Carbon monoxide results, but as the process is highly endothermic the coke tends to cool down to a temperature unfavourable to the desired reaction. This difficulty was overcome by introducing a certain proportion of oxygen with the carbon dioxide. This induces an exothermic reaction, which also forms carbon monoxide. By a proper adjustment of the proportions of oxygen and carbon dioxide it was found possible to maintain a fairly uniform temperature.

The carbon monoxide thus obtained is pure, with the exception of a trace of carbon dioxide, which is removed by passing the gas through a scrubbing tower, where it is absorbed by caustic soda. Finally, the resulting carbon monoxide is dried before proceeding to the production of phosgene by union with chlorine. The essentially new part of the process, apart from the development of the plant, is in the combination of the heating and cooling reactions whereby the incandescent coke is kept at the required temperature.

Dr. Ruttan's Visit

DR. RUTTAN, of Montreal, the President of the Society of Chemical Industry, is expected to arrive in England early in May, if not before, and his visit is looked forward to with considerable interest. The main object of his coming is, of course, to preside over the Annual Meeting of the Society, which this year will be held in Glasgow, but his stay will cover a sufficiently long period to enable him to visit various sections, to make a personal study of the activities of the Society, and to renew his acquaintance with a number of kindred associations. Already he has accepted an invitation to become the guest of the Chemical Industry Club and to address a meeting of members. No doubt other bodies will be equally anxious to entertain him in both his personal and his official capacities. The delegates to the last Annual Meeting in Canada have brought back very good accounts of the President, and everywhere he may count on a cordial welcome.

Points from Our News Pages

Extracts are published from a report on the furnishing and equipment of laboratories prepared by a committee of the Chemical Society (p. 338).

Mr. S. J. Peachey outlined the commercial possibilities of his process for the cold vulcanisation of rubber at a meeting of the Institution of Rubber Industry (p. 342).

Papers on "The Properties of Powders," read at a joint meeting of the Oil and Colour Chemists' Association with the Faraday Society, will be discussed at a further meeting on March 23 (p. 344).

A new British-made chemical porcelain claimed to have a very high resistance to fracture is described by Dr. G. White (p. 347).

In the House of Commons on Wednesday a motion for leave to introduce a bill to repeal the Dyestuffs Act was rejected by a majority of 82 (p. 341).

Our London Chemical Market report describes the trade as a shade quieter, although prices are generally maintained and the undertone is firm (p. 355).

According to our Scottish Chemical Market report the market during the week has been variable and sales disappointing, and the labour trade has had a depressing effect on business(p. 357).

The Calendar

MAR		
20	Chemical Industry Club: "Cotton from Plant to Fabric." W. Perry. 8 p.m.	2, Whitehall Court, London.
20	Royal Society of Arts: "The Constituents of Essential Oils." L. G. Radcliffe. 8 p.m.	John Street, Adelphi, London.
21	Mineralogical Society: "X-Ray Work." Sir W. Bragg.	London.
22	Royal Society of Arts: "The late Mr. Holman Hunt's Experiments on the Permanency of Artists' Oil Colours." Professor A. P. Lawrie. 8 p.m.	John Street, Adelphi, London.
22	Society of Chemical Industry, Newcastle-on-Tyne Section: "Cement." C. H. Desch.	Armstrong College, Newcastle.
23	Royal Society: Papers by Sir R. Glazebrook, Lord Rayleigh, Prof. A. Fowler, Sir J. Petavel, and others.	London.
23	Society of Dyers and Colourists, Bradford Junior Branch: "Dyeing Artificial Silk." P. E. King.	Bradford.
24	Royal Society of Arts, Indian Section: "The Indigo Situation in India." H. E. Armstrong.	18, John Street, London.
24	The Sir John Cass Technical Institute: "Recent Developments in the Glass Industry." W. E. S. Turner and S. English. 7.30 p.m.	Jewry Street, Aldgate, London.
30	Chemical Society: Annual General Meeting, 4.30 p.m. Informal meeting, 8 p.m.	Burlington House, Piccadilly, London.
30	Society of Dyers and Colourists, W. Riding Section: "The Theory and Practice of Piece Scouring." Dr. S. A. Shorter.	Bradford.
30	Society of Chemical Industry, Manchester Section: The Relation between Chemical Constitution and Antiseptic Action in the Coal Tar Dyestuffs." T. H. Fairbrother and A. Renshaw. 7 p.m.	College of Technology, Manchester.
31	Royal College of Science Chemical Society: "Modern Methods of Photographic Development." K. C. D. Hickman.	Royal College of Science, S. Kensington.

The Furnishing and Equipment of Laboratories

Notes by a Committee of the Chemical Society

The following notes on the furnishing and equipment of chemical laboratories have been prepared by a committee consisting of Dr. C. A. Keene, Mr. James C. Philip, and Mr. Alexander Scott. The pamphlet from which they are taken is issued by the Chemical Society, and applications for copies may be addressed to Mr. S E. Carr, assistant secretary.

Tops of Working Benches

THE great majority of bench tops at present in use are made of teak, and these by general consent are very satisfactory. Although in some cases the plain wood is preferred, a common practice is to treat the teak initially and then at intervals with paraffin wax, the impregnation being effected either with the help of a hot iron or by using the paraffin dissolved in petrol or xylene. This treatment has the disadvantage that the paraffin wax thus introduced into the wood is liable to be sweated out by the heat from a hot flask or sand-bath. This objection has been met by the substitution of vaseline for paraffin. As an alternative to paraffin wax, linseed oil, raw or boiled, may be rubbed in periodically, either by itself or in combination with such materials as kerosene or turpentine.

Exigencies of price and supply during the last six or seven years have led to experiments in the employment of other woods than teak: indeed this has been tried occasionally even in the older laboratories. Amongst these other woods are mahogany (Oxford University, Edinburgh University), American oak (Reading University College), basswood (Reading University College), African walnut (Leeds University, Huddersfield Technical College), pitch pine (Bradford Technical College), American whitewood (Reading University College). When soft white wood is employed, as in the case last mentioned, aniline black has been used for impregnation; this treatment, which is said to harden the wood and make it less porous, is followed by washing with soap and then rubbing in raw linseed oil. Venesta (3-ply wood), laid on an inferior wood, is said to be very successful as a bench top (St. Andrews University). English elm in thick planks, with substantial cross-pieces screwed on, finally treated with plaster of Paris wash and then linseed oil, is said to give a fine hard surface.

Tests on the suitability of a number of home-grown woods for laboratory purposes have been carried out at Edinburgh University. In these experiments samples of lime, ash, elm, beech, and sycamore (18 in. $\times 8\frac{1}{2}$ in. $\times$ 1 in.) were treated with water, acid, or alkali and then allowed to dry. Beech was the only one of these woods which stood the tests well. It showed no tendency to soften, warp, or crack under the treatment received.

So far as the committee knows, no other systematic trial of the possibilities of the cheaper woods (alone or impregnated) for laboratory purposes has been set on foot. In regard to isolated cases where alternatives to teak have been introduced during the war, it is clearly too soon to pronounce an opinion on their performance and efficiency.

Apart from wood, other materials are here and there in use for bench tops, *e.g.* ferro-concrete (supplemented with rubber mats), and plain deal covered with linoleum. In a number of cases sheet lead (on a wooden base) is employed, although there is fairly general agreement that this becomes unsightly, and it is of course liable to lift when exposed to heat. Nevertheless, many workers favour a lead-covered bench for "wet" work. In some places and for some purposes bench tops of red tiles (University College, London), set on a light iron frame, might be useful. Alberene stone, a variety of soapstone found in Virginia, which is widely used in the U.S.A. for table tops as well as in fume cupboards, is at present not a practical proposition in this country. The same remark applies to the volcanic stone used in various laboratories in France.

Shelves for Reagents

The material of which laboratory reagent shelves are made has been the subject of inquiry by the committee, and current practice is found to exhibit considerable diversity. Protection of wooden shelves against the action of corrosive chemicals is secured more or less adequately by the use of earthenware trays, opal glass, rubber mats (made, possibly in the laboratory, by vulcanising first-grade standard plantation crepe), uralite, lead, or tiles. In a large number of cases plate glass (or opal glass), without wooden support, is employed for reagent shelves, and is considered highly satisfactory. In one laboratory slate slabs, free from lamination, are used for bottles of strong acids and alkalis. For larger shelves slate would probably be found cheaper than glass. In another instance (King's College, London) Beaver board (a *papier mâche* product) is found to be serviceable for shelves. Where Beaver board is used, it should be the sized variety.

From one quarter the statement has been made that excellent shelves can be made in concrete—say $\frac{1}{2}$ in. thick—by reinforcing with two or three $\frac{5}{16}$ in. iron bars laced through fine-mesh rabbit netting.

In connexion with the question of shelves, the arrangement of bottle racks on students' benches in the form of *movable* stands has proved advantageous in a number of cases, especially school laboratories. Another point to which attention may be directed is that the basis of any white paint used in the laboratory should be zinc oxide; no white lead should be used.

Fume Cupboards and Hoods

The chief materials at present in use as the base of fume cupboards, as well as for the tops of furnace benches, are slate, lead sheet, tiles, and stone. The evidence before the committee shows clearly that where there is exposure to strong heat, reflected it may be from sand-baths, ovens, or furnaces, slate very frequently cracks and proves unsatisfactory. Naturally if the practice is adopted of protecting the surface by portable tiles or asbestos sheet, the risk of cracking is effectively diminished. Under similar heat conditions lead sheet lifts and buckles, and is, therefore also open to objection. The experience of the various laboratories from which information has been obtained seems to show clearly that of the four materials specified above tiles or stone will be found most serviceable for general purposes.

As to tiles, different varieties are in use, but red Ruabon tiles have lately found much favour in various laboratories (Bristol University, Woolwich Arsenal). Attention may be directed to an octagonal non-crazing white tile (2 in. diameter) which is favoured in many quarters in America. These tiles are laid in cement on top of wood first covered with tarred paper and themselves first soaked in water, so that the cement does not dry out by their porosity. For fume cupboards remote from windows there would possibly be an advantage in *white* tiles. Glazed slabs have been tried in some laboratories and found satisfactory.

The laboratories where a fine-grained sandstone (not too thin), such as Yorkshire stone, is employed as the base of fume cupboards or the top of furnace tables, appear to be very satisfied with this material.

For many purposes a fume cupboard base of wood is perfectly satisfactory, and in various laboratories teak has been employed for this purpose. For furnace work, naturally, some more resistant material must be employed. In this connexion the practice in some places of using ferro-concrete or cement concrete on a wooden base is noteworthy, although the risk of fire with such an arrangement is perhaps not quite negligible. Further, although few data are yet available regarding its behaviour under laboratory conditions, it is maintained in some quarters that cement concrete does not stand well where it is exposed intermittently to considerable heat.

Experiments have been made in a number of laboratories (*e. g.*, Glasgow Technical College, Armstrong College) with the object of using an asbestos material—eternite or uralite—in fume cupboards and on furnace tables. Such materials appear to be excellent so far as behaviour towards heat is concerned, but there is some uncertainty as to their permanence under the action of acid and alkaline fluids, or even of water alone.

There are two other matters in connexion with fume cupboards which the committee consider worthy of remark. In the first place, if the ventilation of the laboratory is effected through the fume cupboards, the sliding window of the cupboard should be fitted with stops at either end so that it does not close down absolutely on the base of the cupboard, and, secondly, the ropes and counterpoise for the windows should be outside the cupboard and as easily accessible as possible. It assists the preservation of the ropes if they are dipped in vaseline or molten paraffin before they are fitted. In one

laboratory (Harrow School) catgut rope was supplied for the fume cupboard windows and has lasted well for a number of years. Flexible steel wire rope (University College, London) is also found satisfactory, especially if used with large pulleys.

Sinks and Waste-Water Channels

One impression which the committee has gained from its inquiry is that the provision of sinks, especially on bench tops, is overdone in most laboratories. At convenient points there should of course be capacious washing-up sinks, their number depending on the size of the laboratory and the nature of the work carried on in it, but on the ordinary working chemical bench, except perhaps in the case of school laboratories, the necessities are met by the provision of accessible smaller sinks, preferably placed at the ends of the bench. Indeed, in certain laboratories water is required largely for condensers and filter-pumps, and the receptacle for the waste water in these cases is frequently no more than a narrow lead-lined trough running along the centre of the bench with a fall to one end, or a plain lead pipe, widened to a cup vertically below the tap and leading to the main waste trough—a device that has been found quite satisfactory.

The unanimous opinion appears to be that glazed earthenware has proved the best material for sinks. Lead-lined wooden troughs are seldom used and are being replaced where they existed. Enamelled iron sinks are in use in one or two places. It is perhaps worthy of note in this connexion that the asbestos-cement firms are now making all sorts of sinks, tanks, &c.

There is more room for difference of opinion in regard to the channel carrying the waste from the sink. From the point of view of corrosion alone, an earthenware pipe would be the most satisfactory, but a lead pipe with its adaptability has many advantages. Experience indicates definitely that where a lead pipe is employed to connect the sink with the main waste channel, it should be as steep and as nearly straight as possible, so that the contact of acid waste water with the metal may be reduced to a minimum.

It is generally regarded as highly desirable that there should be attached to each block of benches an earthenware dilution chamber or trap, into which all the waste passes on its way to the main drainage channel. This trap should be accessible and removable so that it may be cleaned out from time to time.

Considerable variety of practice prevails with regard to materials used in the construction of the main drainage channels in laboratories. In the more elaborate installations, these channels consist of half or three quarter-section glazed earthenware pipes, embedded in asphalt on a cement basis and accessible through removable planks in the flooring. Where this has been carried out by careful and competent workmen, it appears to be extremely satisfactory. In some cases, the earthenware pipes are omitted and the channels in the cement are simply lined with pitch (Finsbury Technical College, Glasgow University). Variants on this are: (1) wooden channels lined with pitch, either alone or set in cement, (2) earthenware pipes carried in wooden boxing filled in with pitch.

The joints between sections are the points in the drainage channels where trouble most readily occurs, and considerable importance attaches to the cement used at such junctions. The very large number of recipes for such a cement—almost every laboratory has its own variety—suggests that there is room for investigation in this direction.

Ventilation

In a few laboratories air is introduced under positive pressure (Plenum system), but in the majority of cases reliance is placed on window ventilation supplemented by suction through the fume cupboards. In connexion with the Plenum system, the committee has been informed that iron ducts are liable to vibration, and that lath-and-plaster ducts are preferable. The old system of a burner in the exit flue from fume cupboards is now very generally replaced by an extraction fan. It is important, naturally, to keep the motor outside the flue, but even so the vanes of the fan have to be frequently renewed. One system permits the fan as well as the motor to work in fresh air, viz., the system in which the fan is used to inject a powerful current of air into the flue in the direction of the exit, and so carry out the fumes (Woolwich Arsenal).

Whilst fan ventilation for fume cupboards appears to be most in favour, it is recognised that there is much to be said for gas-flame ventilation. It is maintained by some that flues and burners, if properly designed (by an engineer), give good results where the laboratory is well supplied with air inlets. Where this system is adopted there is less running machinery in the laboratory, and it becomes unnecessary to have a whole set of fume cupboards working when only one is required.

Considerable difference of practice prevails as to the lining of the exit flues from fume cupboards. In a number of instances glazed earthenware pipes are employed, either built in the walls or attached to them, whilst channels of lead, iron (coated internally with acid-resisting paint), and wood (pitch-lined, or painted) are also in use. Poilite and other forms of asbestos-cement also have been tried as a lining for fume cupboard flues. Plain brick channels are in use here and there and are apparently found to be satisfactory. On the other hand, the opinion is held that no material yet tried for fume cupboard flues adequately meets the conditions.

In planning the ventilation of a laboratory, the provision of *down*-draughts at benches and at small wall-hoods (as adopted, for example, at Edinburgh University) may be worth consideration.

Miscellaneous

Water and Gas Supplies.—The committee desires to emphasise the importance of having all pipes and channels easily accessible. The importance of having control valves both for gas and water (1) for each detached room, (2) for each block of benches, is generally realised. In connection with the supply of water to laboratories, the importance of standardising water taps has been realised, but owing to the varying requirements of the local authorities it appears impossible to secure general adoption of any special design which has been tried over a large laboratory and found satisfactory (as, for instance, at Oxford and Cambridge). The future application of stainless steel in the construction of water-taps appears to be a possibility.

Steam.—The committee has been struck by the fact that in the new laboratories recently erected at Oxford and Cambridge the general provision of steam for heating, evaporation, distillation, &c., has been abandoned. The disadvantages of such a system are considered to outweigh the advantages, and there is no doubt that corrosion effects are intensified in presence of excess of moisture, as is, for example, liable to arise when steam jets are fitted in fume cupboards.

Walls and Flooring.—So far as ease of cleaning and freedom from attack by fumes are concerned, glazed bricks are undoubtedly the best material for the walls of a chemical laboratory. Where apparatus has to be affixed to the walls, the hardness of these bricks is a difficulty, and it may in some cases be found desirable to have a dado of wood running round the room for a height of 4 to 5 ft. above the bench level. Ordinary brick walls, distempered in some cases, show no signs of disintegration, even after many years' exposure to the air of a laboratory. Protection of the walls may be secured also by the use of one of the well-known petrifying liquids or of high enamel paint such as velour.

The question of flooring—concrete, wood on concrete, linoleum on concrete or wood—will be settled according to individual taste, but the committee would take the opportunity of pointing out that if a composition flooring material involving a magnesium oxy-chloride cement is employed this must on no account be in contact with any structural iron work. In such a position the metal is liable to very serious attack.

Potash in Fruit Cultivation

A LECTURE on "Potash and its Importance in Fruit Cultivation" was given on Wednesday, March 8, to the Newick Branch of the East Sussex Fruit Growers' Association, by Mr. G. A. Cowie, M.A., B.Sc., A.I.C. The lecturer, after dealing with the function of potash in crop nutrition, with special reference to both bush fruit and top fruit, emphasised strongly the value of potash as a safeguard against disease. Potash could be used very effectively to correct soft luscious growth, produced by an excess of nitrogen, which was particularly liable to fungus and other diseases. Potash had the effect of increasing the vigour of plants and by hardening the tissue rendered it less liable to be penetrated by fungus and other micro-organisms. In the Lea Valley experiments the addition of potash to the fertilisers reduced the number of tomato plants attacked by stripe by practically one-half in one variety and by one-third in another. The Rothamsted experiments also demonstrated the effect of potash in reducing the susceptibility of both grain, grass and mangold crops to fungus diseases.

An Author's Inquiry

To the Editor of THE CHEMICAL AGE

SIR,—Being engaged in writing a treatise on "Gas and its Purification," I had occasion to look up a statement of Lord Macaulay on periodical literature and thought it might be of interest:—"The public judges, and ought to judge, indulgently of periodical works. They are not expected to be highly finished. Their natural life is only six weeks. Sometimes their writer is at a distance from the books to which he wants to refer. Sometimes he is forced to hurry through his task in order to catch the post. He may blunder; he may contradict himself; he may break off in the middle of a story; he may give an immoderate extension to one part of his subject, and dismiss an equally important part in a few words. All this is readily forgiven if there be a certain spirit and vivacity in his style."

I have come across the following lines which are so similar that I venture to ask if they are by the same author. Can any of your readers assist?

The public for all time eternal
Will indulgently judge of a screed
That's published in any old journal
Intended for chemists to read;
It's life's but a month or six weeks and
It's only ephemeral stuff,
The writer is often away from his papers,
At Hoylake or Sandwich is cutting his capers,
That's surely enough.

The postman is waiting and cursing,
The author must quickly jog on,
He'll blunder and put rot (and worse) in
The thesis he's busy upon.
He runs to great length in one portion,
Don't worry; the public meanwhile
Forgives him his errors, if only he knows a
Few jests to enliven his truths, and he shows a
Light-spirited style.

Yours, &c. A. A.

London, March 9.

British-made Dyes

To the Editor of THE CHEMICAL AGE

SIR,—Referring to your report (THE CHEMICAL AGE, p. 309) of the M.P.'s visit to the chemical section of the British Industries Fair, 1922, the incident of the statement made by Mr. Tom Shaw, M.P., respecting "Helio" requires further comment. Mr. Shaw could only have had the statement on hearsay. A thing of this kind ought to be probed to the bottom, and the most made of it, as it may be only one of many similar instances. My experience of Levenstein colours before the war was that many were quite as good as the foreign makes. In particular I remember their "Sulphur Black" of which I used tons; also their "Dianol Brown" which stood the Manchester atmosphere better than all other "direct browns" tried.

Often due to incompetency or other cause, the blame for uneven dyeing or other faults is put on the thing most likely to be accepted as an excuse, and the Dyestuffs Act being in bad odour is used as the "scapegoat"—beware of scapegoats! Let me give you an example. Some years ago a certain print and dye works was restricted to do only a few styles owing to the prevalence of brown stains (called "kierburns") appearing in the goods when finished. The employers' complaint of the large amount of "allowance" to be made for bad work, was always met with the answer "Well you see, Mr.——, it is all due to those kierburns." Mr. —— was advised, and almost persuaded, to replace the kiers with a kind that appeared theoretically impossible to produce "kierburns." However, he consulted an expert, who proved that the stains had nothing to do with the kiers, and so chased the "scapegoat" away, soon to be followed by the manager and his dyes. The manager held his position not by his own ability, but by the good will of his foremen. Soon after there might have been seen, in the corner of the dyers' office, a little gas ring, gone rusty, which at one time was used in preparing rum and coffee. Let me add that even now, after long, long years, sometimes when speaking with certain people when I pay my visits to works, something is wafted on the breeze which causes my mind to wander back to those halcyon days of rum and coffee, and I reflect that, perhaps, not all gas rings have gone rusty.

What I suggest is this. In any case where the home-made product is said not to be equal to the foreign make, first let it be tried side by side, by a practical dyers' chemical expert—not the laboratory boy. If he is satisfied that the colours are equal then send two samples, secretly marked in sufficient quantity to be tried on a practical scale. For example, dye a roll in each of 300 yards or 20 lb. of yarn, one working dyer to do the trials under working conditions. This experiment would not be quite so costly as it appears, as the cloth or yarn would find a market at a price to cover the cost of the cloth.

Yours, &c. DYERS' CHEMIST.

Gold Metallurgy of the Witwatersrand

Paper by Mr. W. Cullen

MR. E. V. EVANS, chairman of the London Section, presided at a meeting of the Section of the Society of Chemical Industry at Burlington House, Piccadilly, on Monday, March 6, when a paper was read by Mr. W. Cullen on "Gold Metallurgy of the Witwatersrand, Transvaal."

Mr. Cullen said that the only reference he could find in the *Journal* of the Society to gold metallurgy was a paper in 1894, but there had been steady improvement since then. So far as the geological side of the subject was concerned, there had been more discussions and losing of tempers about this than in regard to any other scientific side of the question of gold mining on the Rand. Leaving that aspect on one side, however, the author drew attention to the great increase in the depth of mining that had been rendered possible since 1894, owing to the vast improvements in methods of ventilation and schemes for rendering the air saturated with moisture, and experience had been such that it had been proved that no insuperable difficulties would be encountered in this respect to a depth of about 7,000 ft. Whether it would pay to mine at that depth was another matter. Deep mines, however, were not popular with the miners for various reasons. As exemplifying the importance of the Transvaal gold mines, attention was called to the fact that Transvaal gold represents 50 per cent. of the world's output, and some striking figures were also given as to the rate of profit, which it was shown has fallen from 16s. 6d. per ton in 1902 to 9s. 7d. in 1920. Evidence of the growth of the industry was shown by the figures of population which in 1894 was 30,000, whereas it is ten times as great now, the depth of working having increased from 400 ft. to about 6,000 ft. Figures were also given showing how the output per stamp has increased and a description was then given of the New Modderfontein Mines equipment.

The most interesting part of the paper, however, was that relating to the development in the design of the equipment, although the cyanide process was not dealt with, Mr. Cullen saying that he had overlooked it in the preparation of the paper. The whole tendency in the modern plants, said the author, was towards greater simplicity so that instead of having two products to treat with cyanide there would only be one, a fine slime, as against sand and slime which was the standard practice in the existing mines. Many advantages were claimed for the newer design of plant which time alone would show were justified or not, but it was claimed that there would be a reduction of 40 per cent. in capital cost and 1s. per ton in working costs, which latter was an important figure at the present time having regard to the anxiety to save even pennies per ton, and what that means to the industry. The elimination of the sand was a revolutionary change, whilst another development was the elimination of the steam battery altogether, and with amalgamation, which latter was an expensive process. It was only by the application of such methods, said Mr. Cullen, that the gold mining industry in the Transvaal could be brought to its old state of prosperity. Reverting to the cyanide process, reference may be made to the flotation system, which Mr. Cullen does not think is likely to be made a success in the Transvaal owing to the nature of the ores there. This system, he said, was likely to be more successful with complex ores, whereas the ores on the Rand were of a simple nature and easily amenable to the cyanide process.

On this latter point Sir Richard Redmayne, late chief inspector of mines in this country, agreed, although he was a great advocate of the flotation system for coal mining. Mr. Cullen expressed the belief that the modern plants would justify themselves when they were worked out if only by reason of the reduction in the number of operations entailed thereby.

Movement to Repeal the Dyestuffs Act

Defeated by 82 Votes in the Commons

In the House of Commons on Wednesday Mr. Remer (C.U., Macclesfield) asked leave to bring in a bill to repeal the Dyestuffs (Import Regulation) Act, 1920. In doing so he said: "It may be that some hon. members who cheer think that I have changed my opinion. I am still in favour of protection of efficient industries, but I will not allow this Act to be foisted upon me as an example of Protectionist legislation. I am not in favour of any form of protection which has for its object mere profiteering purposes, but only for the purpose of preventing efficient industries from being driven abroad to foreign countries. This Act is mere prohibition. Importation being by licence, it does not provide real protection. I submit that the dyes industry, which was introduced into this country during the war, has by this Act been proved beyond any manner of doubt to be a thoroughly inefficient industry.

"British Dyes, Ltd., have charged monstrous prices for very inefficient material, and in spite of that fact have been unable to make any profits. Some years ago an Act of Parliament was passed known as the Patents Act, introduced by the present Prime Minister, then President of the Board of Trade, and one of the industries which was established in this country as the result of that Act was a factory to make what is known as synthetic indigo. That factory is now owned by British Dyes, Ltd. They charge 2s. per lb. for this synthetic indigo, whereas the same material can be purchased from abroad at 8d. per lb.

"I will read a letter which I have received this morning, and which shows conclusively, I think, the issue upon which I am asking leave to introduce this bill. A well-known firm in Manchester—I am prepared to give the name if I am asked to do so—applied to the Dyes Advisory Committee early in February for a permit to buy 1 ton of lythol red B.M. powder from Germany at 9s. per lb. This was refused, and they were told to use an English substitute, the monolite red, at 16s. per lb. This made a difference on the actual cost of the manufacture, which was known as lake colour, of £798. One ton of dyes makes 9½ tons of dry lake colour, and the difference at £84 per ton is £798. The letter goes on to say:

"'What those people do not realise and refuse to see is that the consequences were—(1) our customer bought abroad and we lost the business altogether; (2) our workpeople would have had a full three weeks' work, and we have been on short time since October; (3) to people like ourselves aniline dyes of the high class are our raw material as much as coal; and (4) they have absolutely killed our foreign business, which took forty years to establish.'

"Yet, in spite of that fact, the goods which they are manufacturing are allowed to come in free and there is no protection whatsoever. There is a still more important reason why I am asking to introduce this bill. The administration of the Act has been deplorably bad. Licences have not been given to substantial people in the trade, but to men of straw, who have made enormous profits by illicit importation. I say further that the administration of the Act gives an unfair advantage to trade competitors who are on the Licensing Committee and who get information as to their competitors' business. I say that the Act has given no protection at all to the consumers of dyes. It has produced dear dyes and bad dyes. Furthermore, I say that British Dyes, Ltd., has been very badly managed. The people who have been put on to the directorate by the Government have been the wrong people. Whatever other methods may be adopted to protect the dye industry this is the wrong method.

A Salford Consumer's Reply

Lieut.-Commander Astbury (U., Salford), as a calico printer and as a large consumer of fine dyes, said he thought he had at least as great a qualification to speak on this question as his hon. friend, and he was going to offer the most uncompromising opposition to the bill.

"I am simply," he said, "going to give the House facts. I am opposing this bill first of all on behalf of the consumer; secondly, on behalf of the producer; and thirdly, on behalf of those classes, which, if this dye industry be encouraged in this country, will be given work. I am going to deal with the position which has been raised. I know that in Manchester there is a very small minority who cry out against this Act. I would refer hon. members to the speech made by the chairman of the Calico Printers' Association at the last annual meeting. They had had a disastrous year, and he seemed to put it all down to the fact that they had not been able to get sufficient dyes to carry out their work. I say quite unequivocally that that was simply used as a political weapon in the arguments in favour of Free Trade, and nothing more and nothing less. When I tell hon. members that I have never been on short time in my works, that I am giving full time to-day, even working overtime, that I am booked up to the end of this year, that I have to purchase the same dyes as the Calico Printers' Association, and others have to buy, and that I have never had the slightest difficulty in getting both from the home and foreign producer what dyes I want, I think the House can take my word for it.

"Whenever application is made to the Licensing Committee by a consumer for a dye, if that dye is not produced in this country he gets his application granted at once. In the case of an agent making application for dyes, very probably his application is not granted at first, because an agent does not make application for the dye asked for by the consumer, but in order to get in a big stock of dyes which he thinks the consumer in the future may want, with the result that if those dyes are not required he puts them on the market and floods out our own producer.

"It is complained that the committee are not carrying out their functions properly with regard to the consumer. I would ask the House just for one moment to look at the composition of the committee. There are three dye users, three independent members, and two other members. Therefore, in order to get a majority they have simply to get one independent member on their side and they can get this licence. I want to put another proposition before the House, because complaint is made that we are not progressing fast enough with the manufacture of dyes. There is a colour rhodamine 6 G. Before the war that colour was sold at 11d. per lb. in this country. During the war I myself paid 140s. per lb. for it. (An hon. member: To Levenstein.) No; to some Jew who had in a supply of it from Germany. To-day there is in this country a firm which is making that colour. I am buying it, and it is equally as good as the German colour.

"Hon. members talk about producing dyes here. Anyone who knows anything about the dye trade knows that in the biggest German works if a new dye is invented it is three years before they put that dye on the market. It has to go through all sorts of tests as to light and atmosphere, and until they can get the colour perfect they will not put it on the market. What our manufacturers are doing now while trade is slack is to perfect these colours. What is going to happen if you repeal this Act? To-day, Germany with the depreciation in her mark, is offering colours which she can sell in this country at a price much below our price. But for other colours which we cannot produce she is asking an extortionate price. (Mr. A. Chamberlain: Hear hear.) If you kill the industry in this country she will ask a more extortionate price for the colours that we can produce.

"It has been said that goods have been sent from Manchester to be printed and dyed in foreign countries. That is absolutely untrue. There was always a small amount that used to go to Mülhausen, but I will give some figures for exports that will prove what I am saying. For two months in 1921 the total exports of printed and dyed goods were 7,032,600 sq. yds, and for two months of 1922, 13,981,700 sq. yds. The total of exports for the two months of 1921 was 121,227,100 sq. yds.; and for the two months of 1922, 126,371,500 sq. yds. The Continent has sent us 578,000 sq. yds. more of dyed and printed cloth, but we have sent the Continent 6,849,000 sq. yds. of dyed and printed cloth more than in the two months of 1921. There is now some improvement in the printing and dyeing trades in Lancashire, but if this bill is to be repealed we fear that in the future this country will go out as a colour-producing country, and we should have to rely solely on ex-enemy countries for our colours..

The House divided:

For	115
Against	197
Majority	82

Leave was therefore refused.

Cold Vulcanisation of Rubber

Commercial Applications of the Peachey Process

AT a meeting of the Institution of Rubber Industry held in London on Tuesday, Mr. J. H. C. Brooking presiding, Mr. S. J. Peachey, of the Peachey Process Co., Ltd., read a paper on the "Cold Vulcanisation of Rubber."

Mr. Peachey said he did not propose to deal in any detail with the history of the discovery of the new process nor with the various theories which have been put forward to explain the mechanism of the chemical action which takes place. He wanted to give some idea of the progress which has been made in adapting the new process to large scale manufacture and to explain some of its numerous industrial applications. He wished, in fact, to demonstrate that this process, which was evolved in a college laboratory and which had occasionally been criticised as being an "academic" process, had proved itself on a large scale to possess industrial possibilities greater than anything which could have been foreseen in the early experimental days. It opened up a new field for the utilisation of rubber conjointly with various waste materials in the production of a wide range of useful and durable materials which should compete in quality with certain products on the market to-day, and could be sold at about half the price. In nearly every case it led to the production of new technical effects which were unobtainable by any other vulcanising process.

Summarising the main features of the process, Mr. Peachey said it was based upon the fact that when rubber is treated alternately with the two gases—sulphur dioxide and hydrogen sulphide—these gases are readily absorbed, and reacting in the material produce an active form of sulphur which combines with the rubber at the ordinary temperature, bringing about vulcanisation. It had been suggested that the sulphur produced in the reaction between sulphur dioxide and hydrogen sulphide was in an atomic form as thiozone, but, in his opinion, this would presume the pre-formation of nascent sulphur and its vulcanising action would probably result from its decomposition into diatomic and atomic sulphur, so that both theories amounted to the same thing.

The process, continued Mr. Peachey, was applicable not only to rubber in its ordinary dry form, but could also be applied to rubber in solution. If a solution of rubber in benzol or naphtha containing hydrogen sulphide were mixed with a solution of sulphur dioxide in benzol, viscosity began to increase, and after a short time the solution set to a jelly which, after evaporation of the solvent, became vulcanised rubber.

The two gases were, he said, cheaply and easily produced, and vulcanisation took place at ordinary atmospheric pressure, and without the aid of heat. This latter feature rendered possible the vulcanisation of rubber incorporated with organic waste material such as leather buffings, wood meal, &c. Further, it rendered possible the use of a large variety of coal tar dyestuffs, lakes, &c., which are destroyed by the hot process of vulcanisation.

Another advantage claimed for the new process was that it rendered possible the wet moulding of rubber goods. Vulcanisation in solution by the gas process could be made a more or less exact quantitative method.

The Chamber Process

The author then described the various modifications in the application of the process in practice. In the chamber process the rubber, or compound containing rubber, is exposed to an atmosphere of sulphur dioxide for an average of about ten minutes; the chamber is preferably of aluminium. After exposure to the sulphur dioxide a current of air is blown through the chamber to clear out the gas. The air current is continued until the adsorbed gas is removed. The chamber is then filled with hydrogen sulphide, and after the material has been in contact with this gas for about thirty minutes vulcanisation is completed. This method, the lecturer pointed out, was only applicable to fairly thin sheet goods. Sheets could however, be built up like ply-wood to any desired thickness after vulcanisation by the two-solution cementing process. The application of the chamber process to the vulcanisation of mixings containing organic filling materials and coal tar dyestuffs was illustrated by a number of exhibits of sole leather, floor and wall coverings, &c., all produced by compounding 30 per cent. of rubber with about 70 per cent. of such waste materials as wood flour, leather buffings, slate flour, &c. Proofed fabrics treated by this process could be dyed with any good coal tar dyestuff, with the exception of methyl violet. Another application of the process was in the curing of goods fashioned from raw rubber in either the crepe or sheet form.

The Two-Solution Process

Dealing with the two-solution process for the vulcanisation of dissolved rubber, Mr. Peachey said a 10 per cent. solution of moderately well masticated rubber in benzole is saturated with hydrogen sulphide and then mixed with a solution of sulphur dioxide in benzole. After thorough admixture by shaking the liquid thickens and eventually sets to a stiff jelly, having sufficient coherence and tenacity to enable it to be handled freely. On eliminating the solvent by evaporation, the gel shrinks to a mass of vulcanised rubber. Practically any benzene soluble coal tar dyestuff could be introduced into the solution, yielding coloured gels and rubbers in great variety. Although the commercial application of the process for producing "poured" goods was foreseen in the early days, the credit for actually applying the process in this way belonged to Mr. Fordyce Jones. Moulded hot water-bottles, tubing, and other goods had been made by this process, while other applications were found in the manufacture of articles from ground waste rubber, the repairing of tyres, and in the cementing of rubber to rubber or to leather, and leather itself to leather.

Plant at Willesden

A brief description of the plant in use at the company's laboratories was then given, in which it was shown that the sulphur dioxide in cylinders is connected up to the mains leading to the gassing chambers. The hydrogen sulphide is generated by the action of dilute hydrochloric or sulphuric acid on sulphide of iron in a "Tantiron" generator, collected in an oil-sealed gasometer, and drawn off as required. The chambers are of sheet aluminium, and are fitted with wire grids or trays. Aluminium stop-cocks are used in conjunction with lead gas mains. The gassing of rubber solution with hydrogen sulphide is effected in a cylindrical aluminium vessel closed by a bolted-down cover through which passes a shaft terminating inside in an Archimedian screw working in a tube. The vessel is connected with the gas supply, and on rotating the screw the solution is continuously drawn up the tube and poured over its top, exposing a large area of fresh solution to the gas all the time. Under these conditions a rapid saturation takes place.

Utilisation of Waste Gas

In reply to possible criticisms regarding the utilisation of waste gases, Mr. Peachey said these gases had, until recently, been blown out to absorbers which absorbed the gases by chemical means. They were now able to absorb the gases physically through towers containing charcoal. Lantern slides illustrating part of the gas generating house at Willesden, the absorption towers and gasometer, and the original curing chamber in which the early experiments had been carried out as shown.

Discussion

THE CHAIRMAN (Mr. J. H. C. Brooking) said that the Peachey process was a revolutionary one, and as such it had inevitably to pass through a stage in which it was held up to ridicule. He was beginning to see its possibilities, although there were one or two points in the two solution process which had not yet been made clear or proved. He had heard a lot about the unpleasant smell of goods treated in this way, but he had found that the trouble was not nearly so great as he had anticipated.

DR. STEVENS, discussing the two-solution process, said he could not understand what advance had been made on the sulphur chloride and other familiar methods. In regard to the author's remarks on hot vulcanisation, he did not know whether Mr. Peachey quite realised the advances that had recently been made with accelerators.

DR. SCHIDROWITZ, in the course of some complimentary remarks on Mr. Peachey's work, said we were also indebted to him for "duroprene" and "accellerene." It had been suggested recently that vulcanisation could be dispensed with. Needless to state, this was not his own opinion. He thought the rubber industry of the future without vulcanisation would be in much the same state as it was in the past. Having seen Mr. Peachey's work at the laboratory at Willesden, he could say, without going into details, that he certainly deserved success.

MR. FORDYCE JONES, who had recently returned from the United States, said the Peachey process was attracting a great

deal of attention there. He was convinced, personally, that Mr. Peachey had achieved the ideal vulcanisation process. He could not agree that the chloride cure was a perfect cure. The rubber industry should take far more interest in new processes and research work. He had heard criticisms of the Peachey process, and after personal experience he could not agree that it was impracticable. It was time that British manufacturers threw prejudice to the winds and found out for themselves what this process could do.

MR. ROGERS said he was actually making experiments in his firm's works with the Peachey process, but he could not yet make a statement on the results.

MR. FRANKLIN said he thought the Peachey vulcanisation process was better than other processes. He would like to know whether the process was foolproof, and whether over-vulcanisation were possible.

MR. CROWTHER said that very careful attention should be paid to any method which was likely to increase the *per capita* consumption of rubber, and he hoped to see the Peachey process taken up commercially in this country.

MR. HOWIE was particularly interested in the process from the engineering point of view, and thought it would have a revolutionary effect on the engineering side of the industry.

DR. CLAY thought the question of smell was of fundamental importance.

MR. BESWICK asked how the process was affected by the ordinary mineral fillers commonly in use.

Mr. Peachey's Reply

Replying to the discussion, MR. PEACHEY said he attached very little importance to the question of smell. It adhered to articles made from wood meal and leather buffings for about fourteen days, but when it evaporated the goods were absolutely sweet. When properly aired, goods had less smell than those cured by the hot process. Experiments in enamelling golf balls had successfully been carried out at the Willesden laboratory. The whole process was very simple in practice. A seventeen-years-old boy was in charge of the curing chamber. He (Mr. Peachey) had eliminated a number of the operations which were necessary with ordinary manufacturing methods. He could not use basic oxide in the process, and litharge should preferably be omitted. He did not attach much importance to this, as his aim was to produce effects which could not be obtained by the hot process.

Annual Meeting of the Institute of Metals

THE annual meeting of the Institute of Metals was held in the hall of the Institution of Mechanical Engineers, Storey's Gate, Westminster, on March 8 and 9. The first day's papers were "Notes on the Corrosion and Protection of Condenser Tubes," by G. D. Bengough; "The Internal Mechanism of Cold Work and Recrystallisation in Cupro-Nickel," by Frank Adcock; "The Effects of Impurities on Recrystallisation and Grain Growth," by C. J. Smithells; "Further Studies in Season Cracking and its Prevention: *Condenser Tubes*," by H. Moore and S. Beckinsale. The following papers were read on March 9: "Some Cases of Failures in Aluminium Alloys," by W. Rosenhain; "Some Mechanical Properties of the Nickel Silvers," by F. C. Thompson; "A Further Study of the Alloys of Aluminium and Zinc," by D. Hanson and Miss Marie L. V. Gayler; "The Assay of Gold Bullion," by Arthur Westwood; and "The Rate of Combination of Copper and Phosphorus at Various Temperatures," by C. A. Edwards and A. J. Murphy.

Industrial Electrical Heating

A LECTURE on the present position and future prospects of industrial electrical heating was given at the University of Sheffield on March 13, by Mr. J. G. Pearce, of the Metropolitan-Vickers Electrical Co., Ltd. After indicating the influence on electrical heating development of the nickel-chromium resistance alloys, the lecturer considered the relative positions of gas and electricity for heating purposes. For precision heating, electricity was unapproached by any other heating agent. Practically any desired temperature could be obtained over a very wide range, and temperature control could be obtained within extraordinarily fine limits. Electrical heating did not distort the material, and spoiled work was almost entirely eliminated. Heaters occupied a minimum of floor space, and were less detrimental to workers than other forms of furnace.

Institution of Petroleum Technologists

THE annual general meeting of the Institution of Petroleum Technologists was held on Tuesday, at the Royal Society of Arts, John Street, Adelphi, London. At the conclusion of the business Professor J. S. S. Brame delivered his presidential address in which he referred to the loss the industry had sustained by the death of Sir Boverton Redwood. He reviewed, in an interesting manner, the work of the Institution from its formation, and dealt at some length with the former International Petroleum Commission. In regard to various proposals as to the most suitable centres for the establishment of an International Petroleum Institute, Professor Brame felt it would be more advantageous to found national or other scholarships. A proposal had been made by a member of the Société de Chimie Industrielle that steps should be taken to resuscitate the International Petroleum Commission, whose activities were put an end to by the War. He, personally, thought that a country such as the U.S.A., which had spent much time and money in establishing tentative standardisation methods of its own, would not be inclined to submit them to an International Commission. Although, as a chemist, he was fully cognisant of the importance of the chemical side of the petroleum industry, he wondered whether there was not a tendency to attach undue importance to this side of the question. If the study of petroleum were only a branch of technical chemistry they might as well become a group of the Society of Chemical Industry. Professor Brame gave a comprehensive review of the standardisation work accomplished by the American Society for Testing Materials and expressed the opinion that we should collaborate with the U.S.A. in arriving at a system of nomenclature, specifications, &c., which would be recognised wherever English was spoken.

Death of Lord Manton

WE regret to record the death, as the result of a fall while out with the Warwickshire Hounds on Monday, of Lord Manton of Compton Verney. He was riding near Stratford-on-Avon with his two sons, when his horse stumbled and threw its rider, who died in a few minutes from heart failure, believed to be due to the shock of the fall. Lord Manton, who was raised to the peerage as lately as the beginning of this year, was formerly Mr. Joseph Watson, chairman of Joseph Watson & Sons, Ltd., Whitehall Soap Works, Leeds. Born in 1873, and educated at Repton and Cambridge, he devoted large sums of money to the promotion of agricultural research. He founded the research department of the Olympia Oil and Cake Co., Ltd., Selby, and established a research laboratory at considerable expense. He was a director of the Lancashire and Yorkshire Railway Co., and during the war was chairman of the committee in charge of the shell-filling factory at Barmborough, near Leeds. His many benefactions included a gift of £50,000 to Leeds Infirmary, which followed one of £6,000 given some years earlier. Lord Manton spent a large sum in the purchase and equipment of the Manton stables, and he was one of the most successful owners of racehorses of recent years. An inquest was held on Wednesday, when Dr. Oldmeadow expressed the opinion that the shock of the fall might have accelerated death. Mr. George Miles Watson, the successor to the title, said his father had a fainting fit about a month ago. The Coroner returned a verdict in accordance with the medical evidence.

Bronze and Aluminium Powders

THE inquiry into the complaint, under Part II. of the Safeguarding of Industries Act, that gold (brass) and aluminium metal powders manufactured in Germany should be taxed, was resumed on Tuesday, February 14, before the committee presided over by Dr. J. H. Clapham.

Mr. Mackenzie Wood, M.P., opened the case for the Bronze Powders Group of the London Chamber of Commerce, and evidence was given by Messrs. S. H. Sharp (managing director of S. H. Sharp & Sons (Leeds), Ltd., textile printers), Percy Heffer (director of Heffer, Scott & Co., wall-paper manufacturers), Ellwood Holmes (W. H. Holmes & Sons, manufacturers of bronze and aluminium paints), A. N. Wood (director of S. Fry & Co., Ltd., bronze powder importers, London), S. J. Hann (director of Griffith Brothers & Co., Ltd.), Joseph Davies (J. Davies and Allen), H. G. Oakley (H. G. Oakley & Co.), C. M. Cleare (Clydesdale Metallic Co.), A. E. Goodwin (secretary of the Federation of Master Printers), J. Spooner (John Kidd & Co.), &c.

The Properties of Powders

Some Recent Work on Grading, Separation and Polishing Described

THE properties of powders formed the subject of a joint meeting of the Faraday Society and the Oil and Colour Chemists' Association in the rooms of the Chemical Society, Burlington House, London, on Thursday, March 9. The Presidents of both societies, viz., Professor A. W. Porter, F.R.S., and Dr. R. S. Morrell, were present, and as it was found that little time was left, after the reading of three papers, for general discussion, it was arranged to continue the discussion on Thursday, March 23. Dr. T. M. Lowry led off with an introductory paper on "The Grading of Powders," in which he gave an account of some of the work which he and Mr. L. P. McHatton has been doing on this subject, aided by the Department of Scientific and Industrial Research, and this was followed by two other papers dealing with the subject from a rather different angle. The one was by Professor P. G. H. Boswell on "The Separation of the Finer Constituents of Sedimentary Rocks"; and the other by Dr. J. W. French on "Abrasives and Polishing Powders for Glass."

Tests for Fineness

Dr. T. M. Lowry, in the opening paper by himself and Mr. L. P. McHatton, said that the fineness of a powder is commonly tested by sieving. The apertures might be circular, as in the trammels used for grinding coal or road metal, or minerals which it was desired to separate by jigging. For powders, sieves woven from wire or silk and having approximately square apertures were used. In the past, these woven sieves were unsatisfactory because, whilst the mesh was made to contain a definite number of wires or threads per linear inch, the diameter of the thread or wire was not specified and, therefore, the dimensions of the aperture were indeterminate. This fault had been remedied in a series of standard sieves devised by the Institution of Mining and Metallurgy. When sieving was no longer practicable grading could be carried out (1) by examination under the microscope; (2) by air separation; (3) by water separation.

Microscopical examination suffered mainly from the fact that the sample examined was extremely minute. Even if the "sampling" were entirely satisfactory, it would obviously be futile to regard the largest particle seen in a single milligram of a powder spread out on a microscope slide, as a correct measure of the fineness of a consignment of powder, weighing perhaps ten tons.

Air separation was already employed in testing cement. In this case, the weight of dust blown away by a regulated current of air was used, in the "flourometer," to estimate the proportion of very fine material in the cement. So far as the authors were aware, no work had been done to determine the size or weight of the heaviest particles which were thus carried away, and even the velocity of the air current used for the separation, was probably unknown. Since, however, the properties of cement were altered profoundly by wetting it—and even with a non-aqueous liquid like paraffin, great care was needed to avoid wetting—the process of separation by air was an unusually attractive proposition, and could readily be developed if it should become important to grade the cement beyond the limits that could be reached by sieving. Again, as a commercial method of separating fine powders, the process of "air flotation" had very great advantages, even in the case of materials which were insoluble in water and not injured by wetting, since the drying of the separated pulp was usually a very troublesome and costly operation; in the case of more delicate materials, it was often the only method of separation that could be developed commercially.

Water Separation

Water separation had been used extensively in the form of a sedimentation test, *e.g.*, in the examination of soils in order to determine the proportion of clay which they contained, and on a large scale for the separation of materials such as emery, into grades of different fineness. These grades were usually distinguished by giving the time during which the powder had remained suspended in water, but neither the grading, nor the nomenclature used to describe it, would be regarded as quite accurate in view of the fact that it was not practicable to specify the distance through which the particles must travel in order to reach the bottom of the vessel in which sedimentation was carried on. A number of elutriators suitable for use in the examination of sediments, had been described by Boswell in a Memorandum on "British Resources of Sands and Rocks Used in Glass Making." These provided for the simultaneous separation of three grades, by using a vertical column of small diameter, which was expanded into a column of large diameter, from which the lightest particles were carried away through an overflow tube; the narrow cylinder in which the heaviest particles were retained, was joined to the tapered end of the wide cylinder by means of a rubber tube, which could be closed with a clip. This apparatus was unsatisfactory on account of the risk of eddies at the junction of the two tubes, and he himself had found that the single vessel form of elutriator described by Boswell in his book was much more satisfactory, even when a separation into several successive grades was required.

Use of the Elutriator

The points on which exact information was required in connexion with the use of the elutriator for the grading of powders were summarised by Dr. Lowry as follows:—(1) the influence of the diameter of the tube; (2) the influence of temperature; (3) the character of the law which expresses the relationship between the diameter of the grains and the velocity of the flow of the water; (4) the actual diameter of the particles of some typical substances for a series of different velocities of flow.

The paper then explained the experimental methods adopted by Dr. Lowry and his colleague with the design of elutriator which was exhibited at the meeting and generally described. Series of experiments were carried out with barytes from which the following conclusions were drawn:—(1) The critical diameter of particles for a given velocity is higher by about 5 per cent. in the narrow tube than in the wide tube. (2) The critical size for a given velocity is higher at low than at high temperatures. The correction for temperature is very small, amounting only to 0.4 per cent. per degree in the critical diameter of the particle, although the temperature coefficient of the viscosity of water is of the order of 3 per cent. of the viscosity at 0 degrees, per degree of rise or fall of temperature. (3) The critical diameter is not a linear function of the velocity, neither does it obey the square or square root law. On the other hand, the logarithms of the diameters corresponding to velocities from 4 to 8 mm. per second, can be represented very satisfactorily by a series of straight lines, as shown in a diagram included in the paper. (4) A complete set of experiments on quartz was carried through, using both the narrow and the wide tube at 9°, 20°, and 40°C. The individual groups of readings were more irregular than in the case of barytes, but the ratio of the diameters of quartz and barytes when averaged over five groups of readings at 4, 5, 6, 7, and 8 mm., averaged 1.422°.

Constituents of Sedimentary Rocks

In his paper on "The Separation of Finer Constituents of Sedimentary Rocks," Professor Boswell, after dealing with fundamentals in elutriation, detailed the procedure in elutriation. He pointed out that before mechanical analysis by elutriation or subsistence was proceeded with, it was necessary to insure that the material undergoing separation should be thoroughly deflocculated.

The experimental condition which was of utmost importance in elutriation is that of maintaining a constant temperature. The viscosity of water decreased rapidly with small increase of temperature, and the density also became less. The final velocities corresponding to particular diameters had been calculated or observed at 15°C. a temperature which could be maintained for days in most laboratories without difficulty. If the temperature of the water varied, one of two courses could be adopted. Either separation could be made at the observed temperatures and a correction applied, or between the inflow and the elutriator could be inserted a coil of tubing immersed in a bath of water heated or cooled so that elutriation proceeded at 15°C. Unless some method of this kind were adopted, the difference in the summer and winter temperatures in some laboratories might introduce a large error.

Strictly speaking, tap water should not be used in elutriation on account of the flocculating power of its dissolved salts. If distilled water were used, there were obvious laboratory difficulties when the total outflow of a series of elutriators amounted to 100 c.c. or more per second. For clays alone, the consumption of water was very much smaller and it became

practicable therefore to use distilled water, as Dr. J. W. Mellor had done. The error involved depended on the proportion and character of the salts present in the particular tap-water used. Elutriation in districts with hard waters might be more troublesome.

Abrasives for Glass

Dealing with "Abrasives and Polishing Powders for Glass," Dr. J. W. French described the process and rate of abrasion of glass, and illustrated several typical abrasives. The old processes of grading by settling and decanting or by settling in a steady stream of water were referred to.

In the process of polishing, the lecturer said it was essential that the amorphous surface layer of molecules should be ploughed away and that the forces applied to the glass through the intermediary of the grains of the polishing medium should not be so great as to form conchoidal splinters. Therefore, instead of a hard cast-iron tool, a softer one, say of pitch, wax, hard felt, or paper, might be employed with an abrasive medium of an extremely fine character that would form spongy accretions. Of these media the most frequently employed was ferric oxide. The final polishing was best effected without the use of any medium. It was customary, therefore, to employ in the final stage only water, and the action was continued until this water just dried up.

Referring to other polishing abrasives, the lecturer said the precipitated hydrate did not give good results as its consistency was gelatinous. Black oxide of iron was the principal ingredient of the trade article "Glassite." Oxide of alumina was sometimes used, although it was not so easily levigated as rouge; this material was the principal ingredient of the trade article "Diamantine." Manganese dioxide was also an excellent medium, but it was not frequently used, owing to its blackness.

It had sometimes been stated that the best polishing media were oxides. Glass, however, could be polished with very fine carborundum, *i.e.*, silicon carbide, which had been specially treated with hydrofluoric acid and when using oil as a medium. Excellent results could also be obtained from the use of carbon and many other substances, provided they could be brought into the required physical condition.

Discussion

THE CHAIRMAN said this was clearly a very big subject, and the discussion would have to be adjourned. There were a lot of colour chemists present who had not had an opportunity of expressing their views, and another opportunity must be arranged for them to do so and to complete the discussion generally.

DR. R. S. MORRELL said colour users were dependent on the pigment makers and grinders for their material, and if anything went wrong with that material then the pigment maker had to stand the blame. The interest in the elutriator which Professor Lowry had brought forward was very great for the colour maker, and the progress in the direction of perfecting that interest would be watched and followed by colour users.

COL. RAMSDEN said that some three years ago he had a large number of complaints from people who bought barytes from his firm and made inquiries as to the cause. He found that the method of testing was by a workman rubbing it on his cheek. That did not appeal to him as a very scientific method, and so he got Professor Lowry to design the elutriator which had been mentioned in his paper and was exhibited. It had now been in use in the works for some time, and whilst the microscope might be regarded as an excellent Court of Appeal, the elutriator produced by Dr. Lowry was an excellent policeman. His firm ran tests three times a day with the elutriator, and it was managed by a small girl, and the product was pronounced to be of the highest quality. Whereas under the old system the residue was 6 per cent. at 7 mm. current, it was now .06 per cent.

The discussion was then adjourned until Thursday, March 23.

Lord Leverhulme on a Trade Revival

ADDRESSING the Lancaster Chamber of Commerce on March 9, Lord Leverhulme said the best way to revive the trade of this country was not to expect something wonderful to be done by some wonderful man, but for all connected with business to do each day their task a little better than they ever did it before. Trade went to those nations who attracted it, and no nation could buy material and handle business better than this country. He was a firm believer in the British working man.

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Collapse of "Tennant's Stalk"

Seven Casualties at a Glasgow Chemical Works

THE collapse, on March 10, of a large chimney stack at the St. Rollox Chemical Works of Charles Tennant & Co., Ltd., Glasgow, resulted in the death of four men and injuries to three others engaged in the demolition of the stack. The structure, which was eighty years old, and was at the time of its erection the highest chimney in the world, was a conspicuous landmark in Glasgow, and was generally known as "Tennant's Stalk."

The chimney consisted of an outer shell with an inner cone about 100 ft. high. A space 3½ ft. wide separated the latter from the outer brickwork, while strong buttresses built across the intervening cavity gave additional strength to the structure. On the appearance of a bulge near the base it was decided to demolish the erection, and a year ago the height—originally 453 ft.—was reduced to 280 ft. About three months ago the demolition was resumed, and at the time of the collapse only some 90 ft. remained.

At the time of the disaster two of the workmen were seated on the top of the stack when one of the iron hoops binding the brickwork gave way. A few minutes later another hoop burst outward and the chimney fell to the ground. Considerable damage was caused to wooden sheds by the falling masonry, and only one man out of the eight escaped injury. A portion of the inner cone, with a large fissure extending nearly a third of the way down one side, was left standing.

Under the direction of an explosives expert from Nobel Industries Ltd., the remaining portion of the stack was demolished with explosives and unsuccessful attempts were made to extricate the bodies of three of the men who were presumably buried under several tons of debris. The three injured men, who were taken to hospital, are recovering, and two of them were allowed to go home on Sunday.

The stack was about 40 ft. in diameter at the base and about 13 ft. at the top, and was only rivalled in height (after it had been shortened) by a chimney at the chemical works of Joseph Townsend, Ltd., of Port Dundas. By a remarkable coincidence another chimney—about 300 ft. high—at the St. Rollox Works collapsed suddenly about ten years ago.

Chemistry of Gasworks Refractories

MR. T. F. E. RHEAD, M.Sc., chief chemist to the Birmingham Corporation Gas Department, read a paper last week before the Midland Junior Gas Engineers, on the "Chemistry and Physics of Gasworks Refractories." As to the use of grog in brick manufacture, he pointed our that the quantity of grog that could be added was limited by the fact that it reduced the strength of the refractory. Generally speaking, the best grog to be used was that made from the clay from which the article was being made, after the clay had been burned a sufficient length of time to take out all the fire shrinkage. Under steaming conditions in vertical gas retorts it was possible that the coal ash had increased opportunity of attacking retort walls, partly due to the thinner scale and partly due to exposure of the ash as the carbon was consumed by the steam. A similar effect was obtained in water gas generators, where slagging action on the refractories was a serious item.

Mr. Rhead laid great stress on the necessity for paying far greater attention to the quality of refractories. Central testing laboratories were needed. The variation in the quality of the raw material was much greater than was commonly recognised, and this was one factor which called for continuous testing and supervision on the part of the manufacturer.

Use of Slag Phosphate

AT a meeting of the Central and Associated Chambers of Agriculture in London last week, Lord Bledisloe, making a statement on slag phosphate, said that as a result of a speech in which he said that the name of slag phosphate was misleading to many farmers who were not chemists, he had received a letter of protest from the Slag Phosphate Co. He wished to say quite frankly that he had never imputed fraud against this company and had never dreamed of doing so, as such interpretation would involve the suggestion of a deliberate intention to deceive, which he would be the last to suggest. The name slag phosphate might incidentally lead those who purchased it into the belief that they were purchasing basic slag. The value of this new phosphate in this country had yet fully to be demonstrated, and experiments to that effect were now taking place at Rothamsted.

Chemical Aspects of Cement

Dr. Desch's Second Lecture

THE course of three lectures by Dr. C. H. Desch on "Cement," arranged by the joint committee of the Society of Chemical Industry (Newcastle Section), reached its second stage at Newcastle on Wednesday, March 8, when there was a good attendance of members.

Dr. Desch said that the essential property of cement was that it should set. The setting of cement was first studied scientifically by Le Chatelier about forty years ago. He began with plaster. Ordinary plaster was made from gypsum by heating to a moderate temperature partially to drive off water but not to dehydrate completely or they would get dead burnt plaster. The resultant material when mixed with water set in a comparatively short time, and was often used for moulds on account of the property it had of expanding somewhat at the moment of setting, thus taking a sharp impression from any mould. Le Chatelier offered an explanation of that, confirmed by later work, and he had no doubt it was substantially correct. What happened in the setting of plaster was that they had a little particle of plaster that formed round it a layer of fairly concentrated solution, which was saturated in respect of hydrates but unsaturated in regard to the gypsum. In ordinary plaster as usually burnt there were always some small particles of gypsum which had not lost water, and they acted as the nuclei for the production of new crystals. The particles acting as the nuclei threw out in all directions their feathery arms, forming "spheralites"—they interlocked, and the interlocking, with cohesion between the crystals themselves, provided the setting. All later work had simply confirmed that. He recommended the addition of alcohol to the water in order to slow down the process for microscopical examination.

Le Chatelier's Theory

Le Chatelier assumed that tricalcium silicate had some solubility in water, but that as it went into solution crystals of the silicate spread out and calcium hydrate was set free. That was generally adopted until the German cement chemist, Michaëlis, put forward the view that the process was colloidal and not crystal. He said the product formed a kind of jelly surrounding the particles. That dried down in a thin film and hardened in the same way as glue or other gelatinous substances would do. That had been a matter of great controversy, and most people had adopted the colloidal hypothesis. He had done so himself in writing on the subject, but Le Chatelier still retained his old opinion. Quite recently the controversy had practically ceased to have any meaning. The work done by Sir William Bragg and others had shown that many of the substances they had called colloidal were really crystalline but very small. It really meant that there was no real distinction between the view of Le Chatelier and Michaëlis. In all probability they were crystals, but exceedingly minute.

One should always remember that the process of setting was very much affected by the amount of water present, and that if they examined powdered materials on a microscopical slide with an excess of water they got larger crystals than if working in a commercial method with a small quantity of water. In the ordinary commercial method they got a more finely-grained cement. The excess of water gave larger crystals, and he did not think it was now necessary to worry about the difference between colloids and crystal substances. The best method of studying what happened in cement setting was to prepare the constituents separately and examine the setting of each one. That had been done in America at the Washington Bureau of Standards Laboratory. The workers there, after exhaustive experiments which Dr. Desch described, came to the conclusion that the setting took place in a characteristic way for each substance. Aluminate was the constituent which set first. The initial set was due to the aluminate, and later the silicates reacted with water.

Dr. Desch showed a series of slides illustrating the setting of Portland cement. There was a great deal of evidence, he said, for the view of Le Chatelier, that the first process was the formation of a highly saturated solution from which the other products separated out. Dealing with the effect of fine grinding, he said that sometimes, when cement was reground, it would set again with water. It was because there were little particles which had become impervious to water as they were surrounded by the thin gelatinous layer. Evidently, then, to use cement economically it should be ground as fine as possible, and that was the chief improvement in recent years; cement was being ground more finely and being used more economically. Those little particles were simply inert matter, and if they wanted inert matter sand was cheaper than cement.

Determination of Free Lime

Dealing with free lime, Dr. Desch referred to the difficulties of determining the amount of free lime and explained the methods of measuring expansion employed in this country and on the Continent. The temperature at which lime was heated had a very great effect upon the cement. It was evident that free lime was an objectionable constituent in cement. It was impossible to avoid it altogether, but it should be as small as possible and one had to take a little risk. The old method of getting rid of it was to aerate it by storing for a long while before use. That was a crude method and good modern cement should not require it. It was still the belief of many engineers that all cement should be aerated, but it was not so. The modern method consisted in introducing a little steam into the mill whilst grinding the clinker. During the grinding, the powder was exposed to the action of the steam and free lime was hydrated and rendered harmless. There was another matter in regard to expansion, and that was the presence of magnesia. The British, and most other specifications, placed a limit on the amount to be included in Portland cement, as it had been found that high magnesia cements were apt to expand. It now seemed probable that it was not due to the high magnesia content—some cements with a high magnesia were giving quite satisfactory results. But in the cement one usually had calcium sulphate as well, and that in the presence of magnesia was apt to be harmful. The magnesia in itself was probably not so harmful as was generally supposed, and faults attributed to that were probably due to other causes. They would probably find before long that it would be worth while to use a limestone fairly high in magnesia without injury to the product.

Chemical Action after Setting

Dr. Desch then dealt with the danger of a cement setting too rapidly, and remarked that to counteract that it had been known for a long while that a small quantity of calcium sulphate, generally in the form of gypsum, would slow down the setting. The actual behaviour of the calcium sulphate was rather curious. The calcium sulphate acted as a catalyst. Another constituent of cement which had an important bearing on cement was the alkalis compound and their effect had not been sufficiently studied. Coming to the chemical action in cement after setting, Dr. Desch said that in that connexion it was desirable to have concrete as dense and as free from porosity as possible. Many of the defects in concrete were due to the bad proportioning of the aggregate, which resulted in the cavities not being properly filled up. It was quite safe to say that the more dense the concrete the better would it resist chemical reactions. After setting, if one had a large quantity of free lime in the cement and the concrete was too porous, water could get in and was capable of washing out the lime. A badly-made concrete would become worse and worse as it became exposed to water owing to the dissolving out of the soluble constituents. In reinforced concrete it was essential to have a good concrete or the steel would rust. It was well known that reinforced concrete steel did not rust if the concrete was sound, and it had been proved that steel which was rusted when put in had been taken out clean and bright. If the concrete was not dense the disintegrating substances would get through and rust the steel. As soon as they got rust there was an outward thrust set up which ended in the breaking up of the concrete. The disintegration of piers and jetties was mostly due to that cause. It was evident that the substance most likely to be attacked was the free lime, and to get good concrete the prevention of the inclusion of too much free lime would mean a better concrete. A method of improving the concrete was to add re-active silicates. By adding materials of a "pozzolana" character the product was not so susceptible to the action of sea water. Another method was to replace alumina by ferric oxide, a method which had been tried with success in Germany, but that method was not to be confused with iron Portland cement. It would appear that to resist sea water the alumina should be kept low—not more being used than necessary for manufacture of the cement. On the whole, the process of setting was fairly well understood, but the question of the behaviour of catalysts was still fairly obscure. So far as setting was concerned, the main outlines, as determined by

Le Chatelier, had been proved substantially correct. In his final lecture he proposed to deal with the question of slags and their influence on the resisting properties of cement.

In answer to questions, Dr. Desch said that whilst cement makers had up to the present used bituminous coal, the success achieved in some furnaces by anthracite duff was such that he believed it was possible to utilise it for the manufacture of cement. He was inclined to favour the application of waterproof substances after the product had been made, and not during its manufacture.

British Chemical Porcelain

New Ware with High Resistance to Fracture

AT a meeting of the Ceramic Society, held at Stoke-on-Trent last week, Dr. G. White, of the Royal Worcester Porcelain Co., Ltd., gave an address on recent developments in the manufacture of British chemical porcelain.

Beginning with a study of the formation of glass, and leading up from this to the structure of porcelain, the lecturer argued that one might regard fracture in super-cooled fluids as either an intended devitrification or a violent attempt at crystallisation. This was the fundamental theory upon which the problem of fracture in porcelains had been investigated. It might be assumed for present purposes that, in crystallisation, this molecular movement assumed an ordered nature, whereby the molecules became marshalled into a close and regular formation. In fracture, the movement did not proceed to the extent which gave rise to close-packed systems, but was operative only in so far as it gave a tendency to the formation of new surface. The theory did not maintain that fracture was wholly the result of crystallisation, but that it was the result of attempted crystallisation under stress.

Glass, with all other homogeneous super-cooled fluids, standing as it did in the uncertain region between the liquid and vectorial states, must, if it was to withstand thermal change without fracture, be given treatment which brought it as far as possible towards the liquid area. A certain amount of evidence available showed that the proper procedure was to take hard-porcelain out of this region, and, by a process of devitrification, remove as far as possible any tendency towards a further attempt at devitrification under stress. By partially removing the tendency to devitrify by inducing crystallisation to the utmost extent, the magnitude of the minimum stress required to rend the porcelain body was raised, so that the minimum stress approximated more closely to that actually required by theory to exceed the forces of cohesion. The requirements for the production of chemical porcelain were (*a*) a body mixture of such a nature as would be capable of as complete a devitrification as possible, and (*b*) an adequate process of devitrification applied thereto.

Crystalline Formations

After presenting a number of lantern slides showing high power magnifications of the crystalline formations exhibited by various types of chemical porcelain, the lecturer mentioned that, if there could be obtained a measurement of the degree of crystallinity and a measurement of the heat change resistance, the battle of chemical porcelain manufacture would, in his opinion, be half-won. On the other hand, if one tested the ware to only half its capacity, nothing more than a crude discrimination was rendered possible between the good types and the very bad. The paraffin test distinguished only between the Berlin and Danish porcelains; but, if one tested the ware to its breaking point, a great variation was revealed in the resistance of a given ware. One such test was the sodium bisulphate test, although with this particular test, to get a serviceable mean of the breaking temperature, one needed to take a big average. The test of cold tongs varied too largely with the weight of the tongs and the temperature of the ware. The test of heating a basin so that the piece became red hot, and then placing it on cold lead, was not enough to distinguish between Berlin and certain other types of porcelain; but heating over a basin so that the inner cone was well up the sides of the basin, broke down Berlin porcelain with the greatest ease. The sodium bisulphate test, in conjunction with others, and aided by a micro examination, had led the lecturer to the belief that the ratio of crystalline to amorphous matter varied directly with the power of resistance to fracture.

Finally, the lecturer mentioned that there had recently been produced at Worcester some trial pieces of chemical porcelain in which the crystallinity of the body was extremely well developed. In accordance with the hypothesis which had been adduced, it would be expected that such a body would reveal a very high resistance to fracture, and by experiment the resistance power to fracture had, in fact, been found to be most exceptional. He hoped that further work carried out on these lines would result in the production of a type of British chemical porcelain which would be fully equal to, if not better than, the Berlin, the Japanese, or other types of ware which had hitherto been adjudged to be superior to British.

Discussion

In the discussion which followed, Mr. Bernard Moore said he would have liked to have heard a little more on the influence that a glaze had in withstanding heat changes, as it was often found that whilst amazingly good results were obtained where there was an absence of glaze, the difficulties were considerably increased when a glaze was added.

Dr. J. W. MELLOR said his experience during the war had been that, when British chemical porcelain was used, the percentage breakage per man in the laboratory jumped up enormously. He was pleased to announce, however, that some five or six tests had recently been made upon the Worcester porcelain, and these tests had come out excellently. He was of the opinion that the liability of porcelain to fracture was not due to crystallisation *per se*, but to the possibility or otherwise of the adaptation of the matrix of the porcelain body of the crystals which developed in the heart of it.

German Indemnity Payments to Greece

Delivery of Chemicals

THE Federation of British Industries is informed through its office in Athens that Greece has received considerable supplies of drugs and dyes from Germany, under the indemnity clauses of the Treaty of Versailles.

Over 120 tons gross has been received to date by the Ministry of National Economy. Comprised in this total are: Ether, over 15 tons; aspirin, 7½ tons; chloroform, about 5 tons; aldehydic acid, 4 tons; lactic acid, 3 tons; urotropine, over 2 tons; quinine, 2 tons; salol, phenacetin, &c. These products come largely from the firms of Mark Bayer, Zimmer, Cherring, &c., and also include certain specialities such as trional, tannigen, atophon, and helmitol.

A large proportion of the deliveries will be taken by the army, and by the various institutions under the control of the Ministry of the Interior, Ministry of Public Assistance, and Universities. The laboratories of the various State departments, of the Interior, Marine, Agriculture, &c., and of the polytechnic schools, will be equipped, the balance of the stocks remaining after this distribution being then sold by adjudication for commercial purposes.

In addition to the foregoing, 25 tons of aniline dyes have also been received, and will be used for commercial purposes. These are principally the products of the well-known firm of Meister, Lucius, and Bruning and Dager.

Operations of the Burma Corporation

IN a circular to shareholders the board of the Burma Corporation, Ltd., enclose a report by Mr. E. P. Matherson, who had visited the company's property in a consulting capacity. The report states that to maintain a daily production of 700 tons of ore from the Bawdwin Mine many improvements will have to be made in the smelter. Most of these were under way. The most important was the construction of a baghouse for filtering the smelter gases. A great deal of experimental work has been carried out on the selective flotation of Bawdwin ores, but up to date, the report states, no flotation reagent has been discovered that will solve the problem. In conclusion, the report states that Nambu (a part of the company's property) was not the place to experiment with new processes, particularly chemical processes, which require skilled European operators.

Ideal Home Exhibition

AMONG the exhibitors at the Ideal Home Exhibition, Olympia, London, which will remain open until March 25, are the Anglo-American Oil Co., Ltd.; Blundell, Spence & Co. Ltd.; Cuirass Products, Ltd.; Channell Chemical Co. (of England), Ltd.; Major & Co., Ltd.; Jeyes' Sanitary Compounds Co., Ltd.; and the Ship Canal Portland Cement Manufacturers, Ltd.

Chemical Importers' Affairs

A MEETING of creditors of H. Gordon, Ltd., 6-8, City Road, London, importers and exporters of chemicals and drugs, was held on March 10 at 8, Staple Inn, Holborn London, Mr. A. E. Tilley, receiver for the debenture holders' and liquidator in the voluntary liquidation of the company, presiding. The statement of affairs showed liabilities of £50,793 12s., of which £37,562 2s. 4d. was due to the debenture holders and £13,231 9s. 8d. to trade creditors. The assets were estimated to realise £51,486 10s. 9d., from which had to be deducted £235 17s. 10d. for preferential claims and £9,407 13s. 2d. due to secured creditors. The assets were, therefore, reduced to £41,842 19s. 9d., or a deficiency as regarded the creditors of £8,950 12s. 3d. The assets were as follows: cash at foreign banks, £36 10s. 9d.; general stock at cost, £13,540 6s. 6d., expected to produce £3,500; other stock, £700; furniture, fixtures, &c., £700; sundry debtors, £11,000; Roumanian book debt, £35,000; and goodwill, catalogues, &c., £500. Mr. Tilley stated that the business was established in 1912 by Mr. Henry Gordon as an importer and exporter of chemicals, drugs, &c. Agencies were established in many countries, and a good business was built up. In 1915 the business was taken over by a private limited company, which was formed with a capital of £5,000, and shares to the extent of £1,060 were subscribed for in cash. On account of the many orders and large contracts which were received, the company required additional working capital, which was obtained by the issue of debentures. For some time prior to the termination of the war the company did good business, but from 1918, as a result of delay in the delivery of goods from Japan, a large and unsaleable stock had to be carried forward into 1921. Then the trade slump was encountered, and very little of the stock could be sold. Last year the company was short of ready money, and the capital was increased by £20,000. Mr. Gordon then subscribed £5,000 for shares. A resolution was unanimously passed confirming the voluntary liquidation of the company, with Mr. Tilley as liquidator, and an advisory committee of the principal creditors was also appointed.

Contracts for Supply of Soap

IN the Chancery Division on March 1 Mr. Justice P. O. Lawrence concluded the hearing of a summons taken out by Mr. J. S. Holmes, voluntary liquidator of R. Martens & Co., Ltd., to decide whether or not Lady Rhondda was a secured creditor in respect of guarantees given by her to the National Provincial Bank for advances made to the company amounting to £104,500. Mr. Bridges, for Lady Rhondda, said that she had also guaranteed advances by the London & South-Western Bank of £105,000, but she did not claim to be a secured creditor in respect of that sum. The company, of which Lady Rhondda was chairman, had five contracts with the Aniline Dye and Chemical Co. for the supply of soap which were only partly fulfilled. The profits on the soap delivered amounted to £4,480, and there had been received from the Aniline Co. instalments amounting to about £11,000 in respect of a judgment obtained against it for £50,100 for breach of contract to deliver the soap. The total liabilities of R. Martens & Co. were about £280,000, so that, reckoning the two banks only as being secured, there were unsecured debts of about £61,000, and all that Lady Rhondda could get at present if she succeeded in her claim to be secured was the £4,480 and the £11,000 previously referred to. His Lordship, giving judgment, held that no security had been given to Lady Rhondda which bound the company and the general body of unsecured creditors in the winding-up. The costs of all the parties as between solicitor and client were made costs in the liquidation.

Affairs of a Chemical Manufacturer

A SITTING for the public examination of Mr. Sidney Fleming (trading as Fleming & Co.), chemical manufacturers, 47, Mark Lane, London, was held on March 8 at the London Bankruptcy Court under a receiving order made on December 20 on the petition of a moneylender. The debtor did not appear, and Mr. W. P. Bowyer, senior official receiver, said that he had not surrendered to the proceedings and was believed to be abroad. No information as to the liabilities or assets was available. Mr. Registrar Hope adjourned the examination *sine die*.

Losses on Caustic Soda Deals

THE public examination of Henry Kater and Arnold Joshua de Meza, trading as Kater Brothers, 9, Billiter Square, London, was held at the London Bankruptcy Court on March 10, before Mr. Registrar Francke. The Receiving Order was made on May 18, 1921, on a creditor's petition, and the joint statement of affairs showed liabilities expected to rank amounting to £20,376 0s. 5d., and the assets were estimated to produce £7,629 13s. 9d. The debtors commenced trading together as Kater Brothers in December, 1912. The debtor, Henry Kater, was first examined, and was questioned in regard to a consignment of ten tons of caustic potash. It appeared that in October, 1920, he was asked by a man in Amsterdam if he could find a purchaser for ten tons of caustic potash. Before debtor could inspect the goods, an invoice was received from the man in Amsterdam for £750, *i.e.*, £75 per ton for the potash. They ignored the invoice, as Kater alleged it was agreed the price should be settled later. The goods were in such condition that they could not be sold at the invoice price. The man at Amsterdam, at the same time as he sent his invoice, instructed the proprietors of a wharf to deliver the goods to Kater Brothers, and in March last he came to London and told the debtors that he had a purchaser for the potash. He offered to give them £90 if they would hand him over the goods and allow him to sell. They accordingly gave him a letter to the bank asking them to hand over to him the warehouse receipt, but they refused to do so, stating that they would continue to hold it as collateral security against differences in respect of bills of lading. Subsequently the bank sold the goods, and on May 13 credited debtors' account with the proceeds, £399 10s. 11d., and the bank were now creditors for £321 14s. 6d., against which they held bills of lading. The examination was concluded.

Sequel to Deals in Soap and Linseed Oil

MR. GUSTAVE EDWARD ZEYEN (trading as Zeyen & Co.), 16, Mark Lane, E.C., who had been interested in large contracts for the purchase and sale of soap, applied at the London Bankruptcy Court on March 7 for an order of discharge from the bankruptcy recorded against him in June, 1920. It was stated that his liabilities amounted to £22,593, and the Trustee had so far realised £129 from assets valued by the debtor at £13,392. In 1917 the debtor entered into a contract for the purchase of oil soap from Lindley Duffield & Co. on which he lost money. He had also had several unsuccessful deals in linseed oil. In opposition to the discharge the Official Receiver submitted (1) that the assets were less than 10s. in the £; (2) that the debtor omitted to keep proper books of account; (3) that he continued to trade after knowledge of insolvency; and (4) that in selling certain machinery and using the proceeds for his living expenses he had been guilty of misconduct. Mr. Registrar Mellor suspended the discharge for three years.

Institute of Patentees

AT the second annual meeting of the Institute of Patentees, held in London on March 10, Sir Harry Foster presiding, Sir William Grey-Wilson, chairman of the executive committee, stated that there were now 281 full members and 396 associate members of the Institute. The Technical Committee had examined 245 inventions during the year and reported on them. The existing great trade depression had not encouraged manufacturers to take up inventions. Mr. G. H. Skinner referred to the need for amendments to the patent law. He advocated an Imperial patent for the whole Empire, giving an inventor in Australia or Canada protection in Great Britain and in other British countries.

Civil Service Estimates

ESTIMATES for Civil Services and Revenue Departments for 1922-23, which have been published as a White Paper, show (*a*) the services for which a Vote on account is required; (*b*) the total net estimate for the year; and (*c*) the total net estimate for 1921-22 (subject to transfers). The figures for the Government Chemist are £16,000, £49,113, and £57,104; those for the Department of Scientific and Industrial Research, £100,000, £297,437, and £416,023; while under the heading "Scientific Investigation, &c.," the amounts are £75,000, £197,774, and £216,931 respectively.

Chemical Exhibits at the B.I. Fair

An Impression : By J. E. Southcombe, M.Sc.

To those pessimists who mournfully speak of the decadence of British manufactures a visit to the recent British Industries Fair should have proved a very stimulating tonic. The sensation one got in strolling through its two miles of stalls was of the variety and magnitude of British industrial activity. Here was a wonderful exhibit of art glassware ; there some beautiful specimens of the leatherworker's skill.

Perhaps the most outstanding feature of the Fair in comparison with similar exhibitions of the past was the increased number of exhibitors in, what may be called, the specialised industries, such, for example, as the manufacture of delicate weighing and testing apparatus, chemical balances, microscopes and optical instruments, fine chemicals, dyes, and drugs. In the large building known as the Chemical Hall we had an unparalleled opportunity of observing the results of the efforts of British chemical manufacturers in the production of dyes, fine chemicals and drugs, and in view of the interest taken in those comparatively new branches of industry one cannot but regret that the exhibits were not seen by a larger section of the general public.

The oft-repeated query of " How is Britain progressing with dyes and fine chemicals ? " has been answered, and none can again doubt the success which has already been achieved, the endless problems which have been solved, and the variety of dyestuffs of highest quality which are now being produced by British firms. Truly this section of the Fair was a chemist's Eldorado, and a lasting tribute to the practical accomplishments of highly trained scientists. There were upwards of twenty stands devoted to the display of dyes and intermediates, representative of all the principal British makers, and a study of their lists shows that close upon one thousand varieties of colours are now being produced, fully equal to, and in some cases surpassing, the foreign article of the pre-war days. When one remembers that these highly complex organic bodies are being produced in bulk from the primary British raw materials right through to the finished products, one feels that in this branch of activity " all is well with England now."

Among numerous specimens of coal tar products shown, specific mention should be made of a large range of chemically pure products such as water-white cresols, phenol, naphthalene, and anthracene, while among intermediates immense progress was shown in the production of the highest grade qualities of naphthylamines, naphthols and their derivatives, anthraquinone, anthrarufine, carbazol, &c. It is interesting to note that although these products were shown by several firms, yet each exhibitor appears to have made a little corner for himself and specialised in certain specific products. In this way the old " bogey " of too much overlapping among makers seems to be disappearing, whilst a sufficiency of healthy competition remains.

Similar remarks apply in great measure to the dyeware exhibits, each individual firm tending to devote its energies into specific channels. For example, we noted two firms operating almost entirely in vat colours, two or three working primarily to supply the requirements of the leather, paper, pigment and confectionery trades, whilst among the general range of textile dyes most firms were moving automatically along their own particular branch of business and perfecting their special colours for these trades.

The writer ventures the opinion that one of the most valuable effects of the show has been the friendly intercourse and exchange of opinions which has taken place between various manufacturers, and which has enabled them to see broadly the direction in which each is moving, so that while still maintaining plenty of competition too much overlapping of manufacture can be avoided which will, on the one hand, increase the efficiency of the manufacturer and will provide for the consumer a still wider range of colours.

The progress of the fine chemical industry does not in any wise lag behind that of the dyestuff and intermediate trade, and here again we were particularly struck with the specialisation which is occurring in this industry. We saw a stand essentially devoted to the development of the chemistry of phosphorus compounds, on which were exhibited specimens of complex inorganic phosphorus derivatives previously only seen in the research laboratory. Complicated inorganic esters, alkaloids, synthetic drugs and perfumes of British manufacture presented an exhibit which did the manufacturers the highest credit.

Perhaps the most interesting effect of a general survey of the Chemical Hall was the impression most forcibly brought to the mind of the " key " meaning of these industries. One reflects how much civilisation owes to colours, dyes, and drugs. The vast industries of woollens, silk, cotton, jute, paper, leather, furs, paints, photographic films, &c., are all essentially dependent upon the chemical industry, and the colour-stuff industry in particular. It is only by the possession of a thoroughly reliable and efficient home industry in such " key " products that lasting success can attend these other great branches of British enterprise, and a study of the exhibits of the various finished products of these trades cannot fail to impress us with the fact that the British dyestuff industry has established itself on a firm and sound foundation, and has already grown to be a great national asset.

Chemical Matters in Parliament

German Reparation Dyes

Colonel P. Williams (House of Commons, March 13) asked the President of the Board of Trade the value of dyes which Germany had undertaken to hand over to this country by way of reparation, if the same had been handed over, and, if not, could he give the reason why, seeing that the Dyestuffs Advisory Committee were constantly giving licences to import dyes from Switzerland which could be obtained from Germany under reparations.

Mr. Baldwin said that under the reparation clauses of the Treaty of Versailles, Germany accorded to the Allies certain options on the stocks of dyes in that country at a fixed date and on the output for a period of five years from January 1, 1920. Inasmuch as the second option was a continuing one, and the extent to which it was exercised and the prices of any dyestuffs taken must depend on current market conditions, it was impossible to form any estimate of the total value of the dyestuffs covered by the Treaty provisions. The fullest possible use was being made of these provisions, and the German obligations were being fully carried out ; but there was no obligation on the German manufacturers to produce according to the requirements of the Allied countries ; the quota which the Allies could take was strictly limited, and that quota had to be allocated between all the Allies.

Work of the Central Importing Agency

Replying to Colonel P. Williams (House of Commons, March 13), Mr. Baldwin said the Central Importing Agency was under the control of the Board of Trade only in so far as it acted as the agent of the Board of Trade for the distribution of Reparation dyestuffs, for which it was remunerated on a commission basis. Separate accounts were kept of all transactions of the Agency in respect of such dyestuffs. The Board had no control over any other operations of the Agency or over the appointment or remuneration of its staff.

Manufacture of Citric Acid

In reply to Mr. Ormsby-Gore (House of Commons, March 14), Sir P. Lloyd-Greame said the imports of citrate of lime from the British West Indies and from Italy during the years 1920 and 1921 were, respectively, 1,933 cwt. and 4,122 cwt. ; and 25,956 cwt. and 6,360 cwt. He had no information as to the present stocks of citrate in Sicily. Citrate as ordinarily used for making citric acid was not covered by any of the headings in the Schedule to Part I. of the Safeguarding of Industries Act, and no application in respect of it could be made under Part II. of that Act.

Export of Fabrics for Dyeing Purposes

In reply to Colonel P. Williams (House of Commons, March 13), Mr. Baldwin said he was aware that certain quantities of woollen and cotton yarn and cloth were being exported to the Continent for the purpose of being dyed or printed there. A similar practice prevailed before the war, and he had no evidence that it was carried on more extensively to-day, or that it was due solely or even mainly to the operation of the Dyestuffs Act.

Anglo-Persian Oil Co.

On March 10 the House of Commons went into committee on a resolution authorising a sum of £950,000 required for the payment of calls on share capital in the Anglo-Persian Oil Co., Ltd. The House divided, and the motion was carried by 192 to 21.

From Week to Week

DR. A. H. SALWAY is reported to have resigned his position as Chief Research Chemist to Lever Brothers, Ltd.

LORD LEVERHULME has appointed Mr. N. B. Powis to be one of three joint managing directors of the Niger Co., Ltd.

Damage to the extent of several thousands of pounds was CAUSED BY FIRE on March 12 at the Bonnington Paper Mills, Leith.

COOKSON & CO., LTD., announce that their Manchester offices are now at Bridgewater Chambers, 6, Brown Street, Manchester.

AN EXPLOSION on March 8 at the shell disassembling factory of George Cohen & Co., Pembrey, near Llanelly, resulted in the death of two workmen.

It is reported that C. H. Bell & Co., Cardiff, and Mr. C. H. Parsons, Huddersfield, have purchased from Joseph Watson & Sons, Ltd., the CASTLE SOAP WORKS, Ashby-de-la-Zouch.

On March 9 the King and Queen paid an informal visit to the IMPERIAL INSTITUTE, South Kensington, London, where they were received by Lord Islington and Professor W. R. Dunstan.

At a meeting of the University Court of the UNIVERSITY OF EDINBURGH on Monday, it was agreed to promote an ordinance instituting a degree in science and technical chemistry.

LORD RIDDELL has accepted an invitation to attend the next annual dinner of the Chemical Industry Club and to propose the toast of "The Profession and Industry of Chemistry."

The council of the Swansea University College has passed a resolution of thanks to MR. C. A. SEYLER, the borough analyst, for a gift of sixty volumes to the chemical section of the library.

The New York *World* reports that a COMMISSION OF BRITISH EXPERTS, headed by Colonel M. L. Wilkinson, is at present in the United States investigating American methods of producing noxious gases.

Application has been made to the Railway Clearing House by the ASSOCIATION OF COKE AND BY-PRODUCT PLANT OWNERS for a further reduction in railway rates and shipping charges on coke and by-products.

Exhibits showing tar distillation and other processes and models of carbon compounds were shown in the chemistry department of the BOROUGH POLYTECHNIC at the annual exhibition of students' work last week.

A paper on "COSTS IN CHEMICAL WORKS" was read by Mr. T. Haworth, on March 9, before a joint meeting of the Liverpool branch of the Institute of Chemistry and the Institute of Costs and Works Accountants.

It was reported at a meeting of the American Chemical Society in Chicago last week that Dr. G. Wendt and Mr. C. E. Iron have succeeded in changing TUNGSTEN TO HELIUM GAS by placing the metal in a temperature of 50,000°F.

LORD LEVERHULME will be the guest of the Labour Co-partnership Association at a public luncheon to be held at the Hotel Metropole, London, on March 29. Lord Robert Cecil will preside, and Mr. D. Milne Watson will be among the speakers.

Judgment has been given by the Seine Tribunal against M. Turpin, the INVENTOR OF MELINITE, who has spent a number of years in endeavouring to obtain a share of the profits made by manufacturers who, he alleges, have been exploiting his inventions.

Smokeless fuel is being experimented with in connexion with the MACLAURIN CARBONISING RETORT. A single unit now in operation at the works of Scottish Dyes Ltd., Grangemouth, is said to be capable of producing 20 tons of smokeless fuel per day.

Among the ADDITIONAL MEMBERS appointed to the general panel of the Railway Rates Tribunal are Major-General S. S. Long, of Lever Brothers, Ltd.; Mr. E. Hoyle, of Brunner, Mond, & Co., Ltd.; and Mr. H. J. C. Johnston, of the Leeds Fireclay Co.

Sales of NITRATE OF SODA by the Chilian Nitrate Producers' Association during the past few days are said to amount to 15,000 tons. As much as 11s. 4d. per quintal has been obtained for part of the nitrate, which is understood to be for March delivery.

The Birmingham Section of the BRITISH INDUSTRIES FAIR was visited by 40,000 persons, including overseas buyers from all parts of the world. Many exhibitors have booked stands for next years' Fair, and in some instances the space has been increased.

The annual dinner of the PAINT AND OIL SECTION of the Glasgow Chamber of Commerce was held in Glasgow on March 10, Mr. A. Stewart presiding. Among those present were Messrs. P. P. Rankin, W. Smellie, C. A. Mackinlay, and M Harrison.

The furnaces which the Scarab Oil Burning Co., Ltd., are now installing at Newcastle, and which were referred to last week, are, of course, for their CALORISING PROCESS, which is designed to prevent the oxidisation of metals in high temperatures up to 1,800°F.

BARIMAR, LTD., 10, Poland Street, Oxford Street, London, announce that they are not involved in the present engineering dispute, and that therefore there is no ban on the employment of Barimar experts. Mr. C. W. Brett reports that welding work is plentiful, and is being carried on as usual.

In his second lecture on "RADIO-ACTIVITY" at the Royal Institution on March 11, Sir Ernest Rutherford dealt particularly with the instability of radio-active substances, and demonstrated the effects of the explosions that take place in these substances in the course of their disintegration.

The Council of Manchester University have appointed DR. ARTHUR LAPWORTH, F.R.S., at present Professor of Organic Chemistry in the University, to the Sir Samuel Hall Chair of Chemistry, and to the Directorship of Chemical Laboratories, as from the beginning of the Session 1922-23.

In their report for the year the Cambridge University Appointments Board state that their work on the industrial and commercial side has been hampered by the prevailing conditions, especially in the technical branches of industry. On the other hand, the SUPPLY OF CHEMISTS AND PHYSICISTS was still too small.

There was a large attendance at Swansea on Tuesday at a lecture given by Dr. C. H. Lander, Assistant to the Director of Fuel Research of the Department of Scientific and Industrial Research, on "THE FUEL PROBLEM." The lecture was given under the auspices of the South Wales branch of the Institution of Mechanical Engineers, and Mr. David E. Roberts, of Cardiff, the vice-president, occupied the chair.

The following candidates have been selected by the Council of the ROYAL SOCIETY to be recommended for election into the Society:—Professor T. H. Bryce, Mr. C. G. Darwin, Dr. C. G. Douglas, Dr. S. R. Douglas, Professor A. J. Ewart, Dr. A. Hutchinson, Dr. F. W. Lanchester, Mr. J. Mercer, Professor S. R. Milner, Professor M. S. Pembrey, Professor F. L. Pyman, Professor G. A. Schott, Dr. N. V. Sidgwick, Mr. D. M. S. Watson, and Sir Alfred F. Yarrow.

At a meeting of the EDINBURGH AND EAST OF SCOTLAND SECTION of the Society of Chemical Industry, held in Edinburgh on March 8, the following officials were elected: Chairman, Dr. H. E. Watt; vice-chairman, Mr. W. A. Williams; hon. secretary and treasurer, Mr. W. T. H. Williamson. Dr. A. Lauder, who has acted as secretary and treasurer of the section for the past six years, was presented with a barometer and books. A paper on the "Determination of Hydrogen Ion Concentration," by Dr. W. W. Taylor and Mr. R. H. Hopkins, was then read.

The Home Secretary gives notice, in pursuance of Sec. 80 of the FACTORY AND WORKSHOP ACT, 1901, that he has amended the draft regulations for the manufactures and processes incidental thereto carried on in chemical works which were issued in December, 1920, and that he proposes to make regulations in accordance with the amended draft. Copies of the amended draft regulations may be obtained from the Chief Inspector of Factories, Home Office, Whitehall, London. Objections to the amended draft must be sent to the Secretary of State by March 24.

At a meeting of the ABERDEEN CHEMICAL CLUB on March 10, Professor Findlay presiding, an address was given by Dr. J. F. Tocher on "Solubility as a Technical Problem in Agriculture." He explained the nature of the official test for slags, and also the unofficial mode of testing mineral phosphates. Dr. Tocher showed that high citric solubility was not associated with increased yield of the turnip crop. If equivalent quantities of phosphates were applied practically the same average weight and yield were obtained, with the possible exception of superphosphate.

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CATALYSIS. The catalysis of oxygen-hydrogen mixtures by means of platinum metals and the contact potential in presence of aqueous electrolytes. K. A. Hofmann. *Ber.*, February 11, 1922, pp. 573-588.

ARSENIC. The separation of arsenic from tungsten, vanadium and molybdenum, using methyl alcohol in a current of air. L. Moser and J. Ehrlich. *Ber.*, February 11, 1922, pp. 430-437.

The theory of arsenic distillation and a new method for the separation of arsenic from all metals in a current of air. L. Moser and J. Ehrlich. *Ber.*, February 11, 1922, pp. 437-447.

PHOTO-CHEMISTRY. The action of light on cinnamic acids and the constitution of truxillic acids. A. W. K. de Jong. *Ber.*, February 11, 1922, pp. 463-474.

Patent Literature

Abstracts of Complete Specifications

174,965. VOLATILISING AND DECOMPOSING HYDROCARBONS, PROCESS FOR. A. J. Stephens, London. From the Canadian American Finance and Trading Co., Ltd., 511, Union Bank Building, Victoria, B.C., Canada. Application date, August 9, 1920.

The process is for distilling and cracking hydrocarbons such as tar-sand, by means of superheated steam. The bituminous sand or rock is crushed and graded, and then delivered to a receptacle where the bitumen is melted by means of a steam jacket and internal steam tubes. The mixture then passes to a separating apparatus in which the hydrocarbon is filtered through a partition of silica, sand or the like. The heating fluid, *e.g.*, superheated steam, and crude bituminous substance are intimately mixed, with resulting vaporisation of the volatile substances. The amount of steam and the pressure and temperature are adjusted so that more heat is available than is required for the vaporisation, the excess being utilised in decomposing or cracking the hydrocarbons. The cracking is thus effected without dehydrogenation and polymerisation, which usually occur when the hydrocarbon is heated by external means. The hydrocarbon is then passed to a series of condensers and scrubbers in each of which a predetermined temperature and pressure are maintained, so that various products such as gas oil, kerosene, and gasolene are obtained.

174,974. IMMERSING SUBDIVIDED SOLIDS OR LIQUIDS IN LIQUIDS, PARTICULARLY MOLTEN METALS, METHOD OF. Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd., and J. S. Morgan, 52, Grosvenor Gardens, London, S.W. 1. Application date, September 7, 1920.

The method consists in feeding the substance on to the surface of a molten metal contained in a closed vessel. A drum rotating on a horizontal shaft is arranged in the vessel so that its lower surface dips into the metal, and the material is carried by the travelling surface as a film or layer between the surface and the molten metal. An effective heating of the powder or liquid to a predetermined temperature is thus obtained. The products may be removed from the surface of the drum by a scraper, while any volatile products are drawn off from the upper part of the vessel. In an alternative, a travelling band having its lower run immersed in the molten metal may be used instead of the drum. The method is applicable for the dehydration or distillation of tar or oils by means of molten lead, the distillation of carbonaceous material such as sawdust, the drying of powders or crystals such as chalk or sodium bicarbonate, the distillation of calcium acetate, and the evaporation of liquids.

174,995. ELECTRICAL PRECIPITATION OF SUSPENDED PARTICLES FROM GASEOUS MEDIA, PROCESS OF AND APPARATUS FOR. A. L. Mond, London. From International Precipitation Co., Inc., 1016, West 9th Street, Los Angeles, Cal., U.S.A. Application date, October 15, 1920.

In apparatus for purifying gases by the electrostatic precipitation of dust particles, it frequently happens that dust particles of viscous substances may be deposited on the discharge electrode as well as the collecting electrode. In this invention these deposits are removed from the electrodes without the necessity of cutting off the current. The discharge electrode consists of an endless wire or ribbon which is kept in continuous movement between two collecting electrodes in the form of plates. The deposit is removed from the wire continuously at a point outside the field of action of the collecting electrode, so that the electric field is not interfered with. The continuous wire electrode is passed over a pair of pulleys of insulating material, and the deposits may be removed by a scraper, also of insulating material, which may be carried along in one direction by the electrode, and then moved back automatically to clean it. The same scraping device may be used for cleaning both electrodes, and is constructed wholly or partly of insulating material. In some cases the passage of the electrode wire over the insulated pulley or roller is sufficient to remove the deposit.

175,006. ALUMINIUM CHLORIDE, PROCESS FOR PRODUCING. E. R. Wolcott, 917, Crenshaw Boulevard, Los Angeles, Cal., U.S.A. Application date, November 1, 1920.

The process is for producing aluminium chloride from material containing aluminium silicate so as to obtain carbon monoxide and chlorine as by-products. Raw material containing aluminium silicate and also carbonaceous material is used, such as oil shales, bituminous shales, or a low grade coal. Alternatively, artificial mixtures may be used, such as low-grade petroleum or petroleum residue, peat, or lignite, with finely divided clay or shale. The material is supplied from a hopper 4 to a retort 1 heated externally by hot gases from a furnace 3. In the first stage the material is heated sufficiently to drive off contained water through the valve 12. The temperature is then raised to distil off volatile hydrocarbons, which pass through the conduit 8 and valve 11 to the condenser 14, provided with liquid and gas outlets 15, 16. A part of these products may be used in the furnace at the burners 18, 19. After this operation the retort contains a

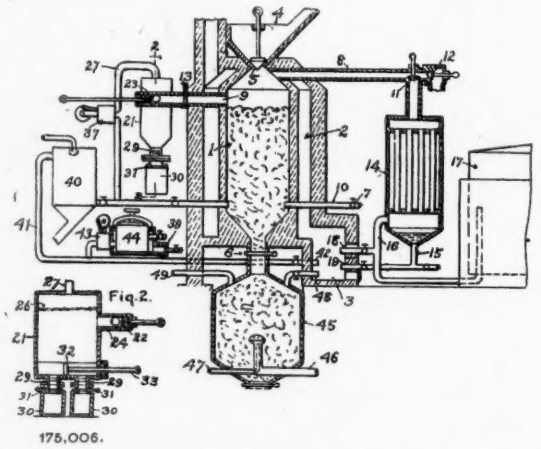


Fig. 2.

175,006.

mixture of dry aluminium silicate material and free carbon. The valves 11, 12 are then closed and the temperature raised to 900°C. chlorine being admitted through the pipe 7. Aluminium chloride is produced and volatilised, and passes out through the conduit 9 to the collecting chamber 21, and the residue is discharged into a gas producer 45. The aluminium chloride condenses and rapidly settles out of the gases, which pass upwards to a pipe 27. The deposited aluminium chloride is discharged by means of a scraper 32 into receptacles 30 without exposure to the air, which would cause rapid decomposition. The residual gas passes through the pipe 27 to a chamber 40 for treatment with calcium hydroxide to remove residual chlorine, and the gas then passes through a pipe 41 to the furnace, where the carbon monoxide is burnt. Alternatively, the carbon monoxide may be passed into a tank 44 containing caustic soda for the production of sodium formate. If the temperature is maintained at 400°C., sodium oxalate is obtained. This process may also be applied by using the raw materials as fuel for power purposes, and then treating the ash, clinker or residue in the manner described. In an alternative, the aluminium chloride may be collected and protected in a liquid such as alcohol, carbon tetrachloride, or liquid hydrocarbon.

175,019. ORTHO-SULPHONIC ACIDS OF AROMATIC AMINES, MANUFACTURE OF. The British Dyestuffs Corporation, Ltd., Imperial House, Kingsway, London, J. Baddiley, J. B. Payman, and H. Wignall, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, November 3, 1920.

In the usual methods for the sulphonation of aromatic amines, a mixture of isomers is produced. The process is for producing the ortho-sulphonic acid of aniline and other primary aromatic amines. The amine is treated with chlor-sulphonic acid in the presence of a solvent such as tetrachlorethane, which is not attacked by chlor-sulphonic acid and has a sufficiently high boiling point to enable the sulphonation to be completed by heating, Examples are given of the treatment of asymmetric *m*-xylidine, *β*-naphthylamine, aniline, *p*-toluidine, *o*-xylidine, *p*-nitraniline, 3:5-dichlor-1-aniline, 2:4-dichlor-1-aniline, 3:4-dichlor-1-aniline, *o*-chlor-*p*-toluidine, dehydro-thiotoluidine, ortho-anisidine, and chloro-anisidine-1:2:5.

175,021. HYDROGENATION OF OILS AND LIQUID FATS. W. J. Mellersh-Jackson, London. From the American Cotton Oil Co., 65, Broadway, Manhattan, New York. Application date, November 3, 1920.

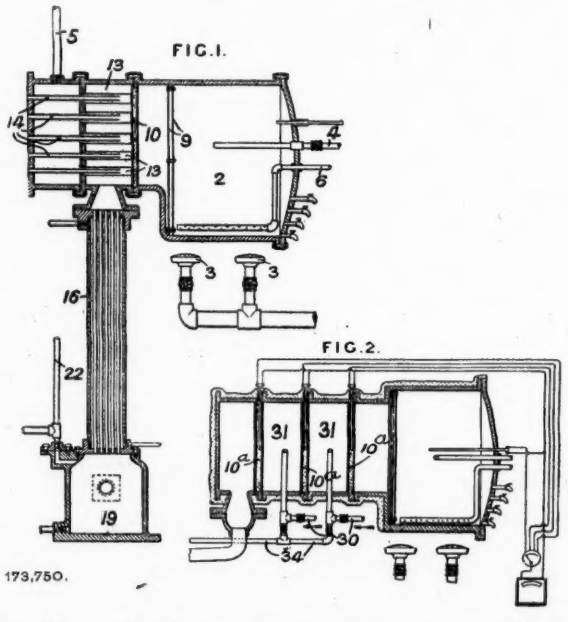
The apparatus is for producing a very minute subdivision and dispersion of hydrogen in a body of oil or liquid fat, and an intimate mixture with the catalyst. The oil is contained in a vessel having a false bottom consisting of a porous plate. The hydrogen is forced into the space below the plate and passes into the mixture of oil and catalyst, and forms very minute bubbles, which remain suspended in the liquid, forming a uniform mass. The hydrogenation is thus greatly accelerated and the quantity of catalyst necessary is reduced. The porous plate used must be such as will produce the required distribution of hydrogen without obstruction by filtration of the oil into the plate. The plate preferably consists of a ceramic material known as "Filtros."

NOTE.—Abstracts of the following specifications which are now accepted appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 154,162 (Chemische Fabriken Worms Akt-Ges.) relating to manufacture of tanning materials, see Vol. IV., p. 165; 154,907 (Farbwerke vorm. Meister, Lucius, and Bruning) relating to manufacture of esters of dioxydiethyl sulphide, see Vol. IV., p. 196; 155,781 (W. Spitz) relating to preparation of calcium iodide, see Vol. IV., p. 287; 158,863 (Nitrogen Corporation) relating to producing sodium bicarbonate and hydrogen, see Vol. IV., p. 515; 159,837 (Soc. Anon des Matières Colorantes et Produits Chimiques de Saint-Denis, and A. R. Wahl) relating to chlorotoluenes, see Vol. IV., p. 567; 163,277 (V. L. Emerson) relating to conversion of hydrocarbon oils, see Vol. V., p. 77.

International Specifications not yet Accepted

173,750. ALDEHYDE-ACIDS, ALDEHYDES, HYDROCARBONS AND SOAPS. C. P. Byrnes, Sewickley, Pa., U.S.A. (Assignee of J. H. James, Pittsburg, Pa., U.S.A.) International Convention date, January 6, 1921.

Crude petroleum, gas oil, or shale oil is subjected to partial combustion by passing its vapour, mixed with air, through a catalytic material. Steam or gas may be added to the mixture as diluents. Complex metal oxides are used as catalysts, the acid radicals being the acid oxides of titanium,



vanadium, chromium, manganese, zirconium, niobium, molybdenum, tantalum, tungsten or uranium, and the basic radicals being the lower oxides of these metals or oxides of iron, copper, nickel, cobalt, lanthanum, thorium, or rare earth metals. Suitable catalysts are "blue" oxides of molybdenum, chromic chromate, tungsten tungstate, uranyl uranate, cobalt molybdate or molybdite, or diuranyl vanadate. The final product obtained contains aldehyde fatty acids, aldehydes, alcohols, light hydrocarbons and waxes. Oil is passed into the heated chamber 2, through the pipe 4, and air by the pipe 6. The gases are mixed by passing through a screen 9, and then pass through the catalyst 10, which is maintained at a temperature not above red heat by means of water or air circulated through pipes 13, 14. The products are condensed in a water-cooled condenser 16, and collected in a tank 19. Clogging of the catalyst is prevented by substituting kerosene for the heavy oil for a short time. The catalyst may be used in several layers 10*a*. arranged in series, and air or gases may be introduced between the layers. If the first layer consists of intermediate oxides of uranium, aldehydes are produced, and these may be oxidised by subsequent layers of intermediate oxides of molybdenum. The product may be used as frothing agent in froth flotation processes or may be distilled to yield motor spirit. The alkali salts are soaps, and the calcium and aluminium salts are waterproofing agents. The residue is a lubricant, and may be thickened or resinified.

174,032. BORNEOL. L. Peufaillit, 12, Rue Leonard Danel, Lille, France. International Convention date, January 10 1921.

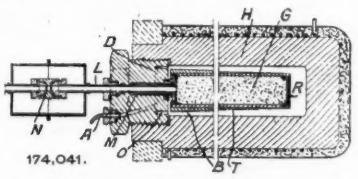
Oil of turpentine is heated in an autoclave with an ester such as butyl chloride, amyl chloride, camphyl chloride, dimethylethylmethyl acetate, isobornyl acetate, salicylates, formates, and benzoates. The bornyl ester produced is then saponified, and the acid liberated is combined with the hydrocarbon formed during the treatment of the oil of turpentine to regenerate the ester.

174,040. CARBON DISULPHIDE. Chemische Fabrik Griesheim-Elektron, 51, Gutleutstrasse, Frankfurt-on-Main, Germany. International Convention date, January 14, 1921.

A layer of charcoal in a vertical shaft is supported on an electrode, and an adjustable electrode projects downwards into it. The cross section of the shaft is diminished near the bottom so that a higher temperature is produced at that point, and sulphur which is melted in an adjacent vessel is run into the shaft at the constriction. Carbon disulphide is produced, and is drawn off through a flue at the top.

174,041. SYNTHETIC AMMONIA. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude, 48, Rue St. Lazare, Paris. International Convention date, January 14, 1921.

The catalytic material G, used in the Claude process for the synthetic production of ammonia, is contained in a tube T mounted on the exit tube L which is attached to the screwed plug D. When it is required to renew the catalyst, the plug



D with the tube T may be detached bodily, and replaced by another tube containing fresh catalyst. The plug D is cooled by passing the gaseous mixture through it by the opening A and annular conduit O. The hot gases leaving the apparatus are prevented from heating the plug D by means of an asbestos lining M.

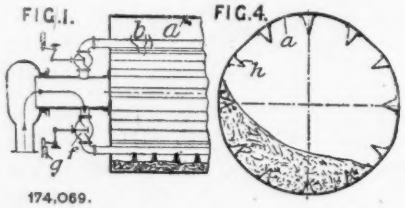
174,052. BARIUM HYDRATE. C. Deguide, 20, Avenue de Ceinture, Engheim, Seine-et-Oise, France. International Convention date, January 13, 1921.

Barium silicate is produced from silica and barium carbonate or mono-barium silicate and barium carbonate in a rotary or tunnel furnace at 1,300°-1,500°C. The proportions are such that a silicate having the formula SiO_2, 3BaO is obtained, or a silicate intermediate between this and SiO_2 2BaO. The silicate is then treated with water to obtain barium hydrate and mono-barium silicate, the latter being used to convert another charge of the carbonate into trisilicate.

174,069. DISTILLING. Maschinenfabrik Augsburg - Nürnberg Akt. Ges., Nürnberg, Germany. International Convention date, January 17, 1921.

Steam is supplied to a rotary distilling drum *a* by perforated pipes *b*, which rotate with the drum. Each pipe is

provided with a valve *f*, connected by levers to a cam disc *g*, so that steam is only admitted to those pipes *b* which



174,069.

are either above or below the material in the drum as it rotates. If the drum is provided with lifting blades *h*, these may be perforated and the steam supplied through them.

174,077. Gas Manufacture. J. Weiss, 17, Mária Valéria ucta, Buda Pest. International Convention date, January 13, 1921.

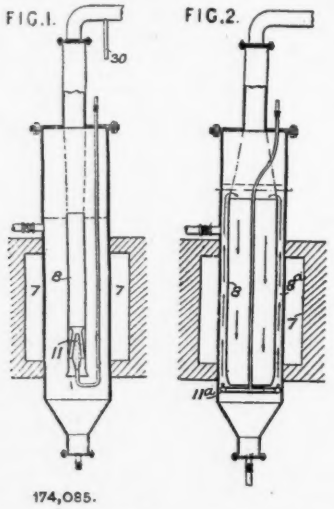
Solid fuel is distilled in a rotary retort at a low temperature by passing it through in counter-current to a stream of hot gases. The gases may be cooled by mixing with inflammable gases of lower temperature such as those produced by the distillation which have been freed from tar and water. The gases delivered to the retort may be preheated by the heat liberated in condensing the tar, &c.

174,078. Synthetic Drugs. Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. International Convention date, January 13, 1921.

Arsenobenzene derivatives, including methylene sulphoxylate compounds of such, are combined with other methylene sulphoxylate compounds of amino bodies to obtain stable soluble arseno compounds. The combination is effected in the dry state or in solution or suspension. Numerous examples are given.

174,085-6-7-8. Cracking Hydrocarbon Oils. Gulf Refining Co., Frick Building Annex, Pittsburg, Pa., U.S.A. (Assignees of W. F. Faragher and W. A. Gruse, Mellon Institute of Industrial Research, Pittsburg, Pa., U.S.A.). International Convention date, January 15, 1921.

174,085. Hydrocarbon oils, lignite or coal tar, or tar oils are cracked in a still heated externally, and deposition of carbon on the hot walls is prevented or removed by circulating the oil rapidly by injecting the gas resulting from cracking, natural gas, casing-head gas, or steam. The still is heated by a furnace 7, and contains a coaxial open-ended tube 8. The gas is injected through a nozzle 11 in the lower end of



174,085.

the tube 8, forcing the oil upwards through the tube and downwards between the tube and the still walls. Sand, fine gravel, or metal filings may also be added to prevent deposition of carbon. The gas may alternatively be injected into the annular space in the still between the shell and a wide tube 8*a*, by means of a perforated tube 11*a*. The gas may be drawn from the main gas outlet of the still by a pipe 30.

Latest Notifications.

176,306. Apparatus for scouring, dyeing, and similarly treating with liquid, fabrics in the piece in continuous process. Tilbereisen, M. March 2, 1921.

176,319. Manufacture or production of metaldehyde. Elektrikzitäts Lonza, March 3, 1921.

176,321. Continuous process for the manufacture of caustic soda or caustic potash. Deguide, C. February 26, 1921.

176,343. Production of phenglamine black and the process of dyeing therewith. March 1, 1921.

176,344. Process for the manufacture of hyposulphites. Farbenfabriken vorm. F. Bayer & Co. March 3, 1921.

176,353. Preliminary treatment of bleaching earths. Schweizerische Sodafabrik. March 2, 1921.

176,354. Process for the production of calcium hydride (C_aH_2.) Kiesewalter, A. March 2, 1921.

176,377. Process for the manufacture of light-proof lithopone. Cordes & Co. March 4, 1921.

Specifications Accepted, with Date of Application

156,103. Silver thioglycallate of sodium, Process for the manufacture of. Chemische Fabrik Flora. November 12, 1919.

156,543. Separating or isolating organic gases or vapours of organic products, Process for. Farbenfabriken vorm. F. Bayer & Co. November 3, 1916.

161,159. Leaching minerals, Apparatus for. Soc. Generale d'Evaporation Procèdes Prache et Bouillon. March 30, 1920.

175,670. Carbonising coal and the like, Method of. G. P. Lewis. August 31, 1920.

175,672. Electrolytic cell. J. Harris and J. R. Rose. September 13, 1920.

175,778. Regenerative retort settings. H. Koppers. November 29, 1920.

175,795. Sodium pentaborate from boron ores, Process for the production of. K. Harding and B. D. Jones. December 3, 1920.

175,814. Grinding and crushing mills and the like. C. E. V. Hall and S. J. A. Mills. December 9, 1920.

175,840. Separation of gaseous mixtures, Centrifugal means for. E. N. Mazza. December 21, 1920.

175,888. Coal, Coking of. S. R. Illingworth. February 2, 1921. Addition to 164,104.

175,902. Coke ovens. E. C. R. Marks. (*Soc. des Fours à Coke Semet-Solvay et Piette Soc. Anon.*) March 1, 1921.

Applications for Patents

American Smelting and Refining Co., and White, A. E. Method of treating metallurgical gases. 7167. March 10.

Birch, G. L. Saturation of fluids by gases or air 6894. March 8.

British Cellulose and Chemical Manufacturing Co., Ltd., Bader, W., and Dickie, W. A. Manufacture of compositions with cellulose derivatives. 6843. March 8.

British Dyestuffs Corporation, Ltd. Mixtures for dyeing. 7255. March 11.

Burt, Boulton, and Haywood, Ltd., Elphick, F. C., and Gray, J. R. Manufacture of colloidal sulphur. 6891. March 8.

Daniels, W. Process for treatment of carbonate of soda. 7118. March 10.

Eriksson, J. R. Vaporising-apparatus for liquid fuel. 7242. March 11.

Fiddes, W. J. Effecting intimate contact between solids and liquids and gas or air for impregnating and/or drying. 6559. March 6.

Ganahl, C. F. de. Distillation of coal, shales, &c. 6886. March 8.

General Electric Co. Methods of making silica or quartz glass. 6856. March 8.

General Rubber Co. Treating rubber latex, &c. 6585. March 6. (United States, December 7, 1921).

Howards & Sons, Ltd., and Blagdon, J. W. Manufacture of thymol. 7170. March 10.

Jones, F. C. Process for treatment of rubber. 7247. March 11.

Lucas, O. D. Process for hydrogenating hydro-carbons. 6708. March 7.

Margulies, O. Process for preparation of aromatic carbonyl compounds containing trivalent arsenic. 7119. March 10.

Margulies, O. Process for preparation of derivatives of organic arsenic compounds. 7120. March 10.

Margulies, O. Process for preparation of arsenic oxides and arsenobenzols. 7144. March 10.

Moscicki, I. Superheating gases or vapours. 6600. March 6.

Naamlooze Vennootschap Philips' Gloeilampenfabrieken. Process for manufacture of carbon bodies. 7152. March 10. (Holland, March 12, 1921.)

Norsk Hydro-Elektrisk Kvælstofaktieselskab. Process for manufacture of hydrogen, carbonic oxide, or mixtures of these gases. 6889. March 8. (Norway, June 7, 1921.)

Sanderson, W. E. Mixtures for dyeing. 7255. March 11.

Simon, T. Manufacture of magnesia or magnesium carbonate from materials containing magnesium and calcium. 6737. March 7. (Germany, March 7, 1921.)

Soc. Chimique des Usines du Rhône. Process for production of solutions of volatile oils. 7014. March 9. (Germany, April 20, 1921.

Walter, R. Desulphurising-media for metals and processes for desulphurisation of iron. 7098. March 10.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers, those interested in close variations in prices should study the market report.*

LONDON, MARCH 16, 1922.

THE chemical trade has been, if anything, a shade quieter than has been the case during the last two to three weeks. Nevertheless, prices have been generally maintained, and the undertone is firm. Orders in the main still are limited to near requirements.

There is very little of interest in export business, most markets still being very hesitating in regard to placing substantial orders.

General Chemicals

ACETONE is in better demand, and the value is well maintained.

ACID ACETIC is firm, but the demand has not been quite so heavy.

ACID FORMIC is in moderately steady request.

ACID LACTIC has been in rather better demand, and the price is well maintained.

ACID OXALIC.—Despite a very slow trade the price is maintained.

ACID TARTARIC.—The demand has improved, and the price now appears to be firming up.

BLEACHING POWDER.—Makers have reduced their price by £1 per ton.

CALCIUM CARBIDE is quietly easy.

COPPER SULPHATE.—A small export business has been transacted, and makers now appear to be slightly firmer in their ideas of price.

CREAM OF TARTAR has advanced in value, and there are more inquiries on the market.

FORMALDEHYDE is again easier, but, on the other hand, stocks are extremely light.

LEAD ACETATE has been in slightly better demand, and the present low values would appear to be attractive from the buyer's point of view.

LEAD NITRATE is featureless.

LITHOPONE is inclined to be easy, but the demand has been fair.

POTASSIUM CAUSTIC.—Only a small business has been transacted, with a plentiful supply available.

POTASSIUM CARBONATE is inclined to be harder, and there are several inquiries on the market.

POTASSIUM PRUSSIATE is steady and firm.

POTASSIUM PERMANGANATE is quietly steady at last quoted figures.

SODIUM ACETATE is fairly steady, but with only a moderate demand.

SODIUM BICHROMATE has been a better market, and the foreign quotations show an advance.

SODIUM CHLORATE continues idle and without feature.

SODIUM NITRATE has been seldom called for, but the value is unchanged.

SODIUM PRUSSIATE continues a very firm spot, with inquiries in excess of supply.

ZINC SULPHATE has been in slightly better request.

Coal Tar Intermediates

There is no very signal improvement to report for the last week, but a fair number of small orders have been booked, and a certain amount of export inquiry is about.

ALPHA NAPHTHOL is firm, and a fair inquiry is about, while one or two orders have been booked.

ALPHA NAPHTHYLAMINE is featureless.

ANILINE OIL and SALT continue to pass into consumption without change in price.

BENZIDINE BASE.—A fair trade has been done, and the price is without change. There seem to be scarcely any parcels remaining in second hands.

BETA NAPHTHOL is steady, and there have been one or two large inquiries.

CROCEINE ACID is firm, with a steady business passing.

DIMETHYLANILINE is without special feature.

DINITROCHLORBENZOL continues firm, with a certain amount of inquiry about.

DIPHENYLAMINE is steady, and there are only small stocks available.

H. ACID is firm, and a fair bulk of orders has been received on home account.

METAPHENYLENEDIAMINE has been in demand.

NAPHTHIONIC ACID is firm with a steady business passing.

NITROBENZOL is the turn weaker.

PARANITRANILINE is firm, and there seems to be practically no resale material about.

Coal Tar Products

Although an increased amount of business appears to be going on in coal tar products, prices generally continue to have a downward tendency. In some cases the fall is fairly rapid. This is particularly so in crude and refined benzol.

90's BENZOL can be bought at 2s. 2d. on rails.

PURE BENZOL is in poor demand, and is worth about 2s. 7d. on rails in the Midlands and 2s. 11d. in the South.

CREOSOTE OIL is plentiful and is worth about 4½d. per gallon in the North, and 4¾d. to 5d. in the South.

CRESYLIC ACID is quoted at 2s. on rails for the pale quality, while the dark 95/97% is worth about 1s. 9d.

SOLVENT NAPHTHA is weak and is worth 2s. 2d. on rails.

HEAVY NAPHTHA is also in poor demand and is quoted at 1s. 10d. to 1s. 11d. at works.

NAPHTHALENE has little inquiry, crude being worth from £5 to £7 per ton, while refined is worth from £15 to £17.

PITCH.—There is no change to report.

Sulphate of Ammonia

Conditions remain the same.

Current Prices

Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	10	to	0	2	0
Acetone oil	ton	87	10	0	to	90	0	0
Acetone, pure	ton	80	0	0	to	82	10	0
Acid, Acetic, glacial, 99-100%	ton	55	0	0	to	60	0	0
Acetic, 80% pure	ton	47	0	0	to	48	0	0
Arsenic	ton	90	0	0	to	95	0	0
Boric, cryst.	ton	60	0	0	to	65	0	0
Carbolic, cryst. 39-40%	lb.	0	0	6½	to	0	0	7
Citric	lb.	0	1	11	to	0	2	0
Formic, 80%	ton	72	10	0	to	75	0	0
Gallic, pure	lb.	0	3	6	to	0	3	9
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol.	ton	40	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	45	0	0
Nitric, 80 Tw.	ton	30	0	0	to	31	0	0
Oxalic	lb.	0	0	8½	to	0	0	9
Phosphoric, 1.5	ton	43	0	0	to	45	0	0
Pyrogallic, cryst.	lb.	0	6	9	to	0	7	0
Salicylic, Technical	lb.	0	0	10½	to	0	1	0
Salicylic, B.P.	lb.	0	1	4	to	0	1	6
Sulphuric, 92-93%	ton	8	0	0	to	8	10	0
Acid Tannic, commercial	lb.	0	2	9	to	0	3	0
Tartaric	lb	0	1	3	to	0	1	4
Alum, lump	ton	12	10	0	to	13	0	0
Alum, chrome	ton	30	10	0	to	32	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	12	0	0	to	13	0	0
Aluminium, sulphate, 17-18%	ton	13	10	0	to	14	10	0
Ammonia, anhydrous	lb.	0	1	8	to	0	1	10
Ammonia, .880	ton	35	0	0	to	37	0	0
Ammonia, .920	ton	22	0	0	to	24	0	0
Ammonia, carbonate	lb.	0	0	4	to		—	
Ammonia chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	90	0	0	to	95	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to		—	

	Per	£	s.	d.		£	s.	d.
Amyl acetate	ton	170	0	0	to	180	0	0
Arsenic, white, powdered	ton	42	0	0	to	44	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, Chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	16	0	0	to	17	10	0
Nitrate	ton	35	0	0	to	37	0	0
Sulphate blanc fixe, dry	ton	24	0	0	to	25	0	0
Sulphate, blanc fixe, pulp	ton	15	0	0	to	16	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	—		
Bleaching powder, 35-37%	ton	13	0	0	to	14	0	0
Borax crystals	ton	29	0	0	to	33	0	0
Calcium acetate, Brown	ton	8	0	0	to	9	0	0
,, ,, Grey	ton	10	0	0	to	11	0	0
Calcium Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	7	10	0	to	8	0	0
Carbon bisulphide	ton	60	0	0	to	62	0	0
Casein, technical	ton	75	0	0	to	80	0	0
Cerium oxalate	lb.	0	3	6	to	0	3	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	11	0	to	0	11	6
Oxide, black	lb.	0	10	6	to	0	11	0
Copper chloride	lb.	0	1	3	to	0	1	0
Sulphate	ton	28	10	0	to	29	0	0
Cream Tartar, 98-100%	ton	125	0	0	to	130	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol	ton	72	10	0	to	75	0	0
Formusol (Rongalite)	lb.	0	3	9	to	0	4	0
Glauber salts, commercial	ton	4	5	0	to	4	10	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols	gal.	0	2	5	to	0	2	6
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	42	0	0	to	45	0	0
Carbonate (White Lead)	ton	40	0	0	to	44	0	0
Nitrate	ton	46	10	0	to	48	10	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	25	0	0	to	26	0	0
Magnesium chloride	ton	10	0	0	to	10	10	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	8	0	0	to	8	10	0
Sulphate (Druggists')	ton	13	10	0	to	14	10	0
Manganese, Borate	ton	70	0	0	to	75	0	0
Sulphate	ton	70	0	0	to	75	0	0
Methyl acetone	ton	85	0	0	to	90	0	0
Alcohol, 1% acetone	ton	75	0	0	to	77	10	0
Nickel sulphate, single salt	ton	61	0	0	to	62	0	0
Ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potash, Caustic	ton	34	0	0	to	35	0	0
Potassium bichromate	lb.	0	0	7½	to	—		
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride 80%	ton	15	0	0	to	20	0	0
Chlorate	lb.	0	0	4½	to	0	0	5
Meta bisulphite, 50-52%	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	45	0	0	to	47	0	0
Permanganate	lb.	0	0	9	to	0	0	10
Prussiate, red	lb.	0	3	9	to	0	4	0
Prussiate, yellow	lb.	0	1	2	to	0	1	2½
Sulphate, 90%	ton	20	0	0	to	22	0	0
Salammoniac, firsts	cwt.	3	5	0	to	—		
Seconds	cwt.	3	0	0	to	—		
Sodium acetate	ton	25	0	0	to	26	0	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	5½	to	—		
Bisulphite, 60-62%	ton	25	0	0	to	27	10	0
Chlorate	lb.	0	0	3½	to	0	0	4
Caustic, 70%	ton	23	10	0	to	24	0	0
Caustic, 76%	ton	25	0	0	to	25	10	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	13	10	0	to	14	0	0
Nitrite, 96-98%	ton	35	0	0	to	37	10	0
Phosphate, crystal	ton	20	10	0	to	21	0	0
Perborate	lb.	0	1	3	to	0	1	4
Prussiate	lb.	0	0	9½	to	0	0	10
Sulphide, crystals	ton	13	0	0	to	14	0	0
Sulphide, solid, 60-62%	ton	23	10	0	to	24	0	0
Sulphite, cryst	ton	13	0	0	to	14	0	0
Strontium carbonate	ton	60	0	0	to	65	0	0
Strontium Nitrate	ton	60	0	0	to	62	10	0
Strontium Sulphate, white	ton	7	10	0	to	8	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	13	0	0	to	14	0	0
Roll	ton	13	0	0	to	14	0	0
Tartar emetic	lb.	0	1	6½	to	0	1	7
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	5	to	0	1	6

	Per	£	s.	d.		£	s.	d.
Zinc chloride, 102 Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96-98%	ton	35	0	0	to	40	0	0
Oxide, 99%	ton	38	0	0	to	40	0	0
Dust, 90%	ton	47	10	0	to	50	0	0
Sulphate	ton	18	10	0	to	19	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	2	3	to	0	2	6
Alphanaphthol, refined	lb.	0	3	0	to	0	3	3
Alphanaphthylamine	lb.	0	2	0	to	0	2	3
Aniline oil, drums extra	lb.	0	1	0	to	0	1	1
Aniline salts	lb.	0	1	1	to	0	1	2
Anthracene, 40-50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	9	to	0	4	3
Benzidine, base	lb.	0	5	9	to	0	6	0
Benzidine, sulphate	lb.	0	5	9	to	0	6	0
Benzoic acid	lb.	0	1	7½	to	0	1	9
Benzoate of soda	lb.	0	1	6	to	0	1	7
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	4	9	to	0	5	0
Betanaphthol	lb.	0	1	9	to	0	2	0
Betanaphthylamine, technical	lb.	0	6	0	to	0	7	0
Croceine Acid, 100% basis	lb.	0	3	6	to	0	3	9
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	2	9	to	0	3	0
Dinitrobenzol	lb.	0	1	3	to	0	1	4
Dinitrochlorbenzol	lb.	0	0	10	to	0	1	0
Dinitronaphthaline	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	5	to	0	1	6
Dinitrophenol	lb.	0	2	9	to	0	3	0
Dimethylaniline	lb.	0	2	6	to	0	2	9
Diphenylamine	lb.	0	4	3	to	0	4	6
H-Acid	lb.	0	6	6	to	0	7	0
Metaphenylenediamine	lb.	0	5	6	to	0	5	9
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	6	0	to	0	6	6½
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	3	3	to	0	3	6
Naphthionate of Soda	lb.	0	3	3	to	0	3	6
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitronaphthalene	lb.	0	1	4	to	0	1	5
Nitrotoluol	lb.	0	1	0	to	0	1	2
Orthoamidophenol, base	lb.	0	10	0	to	0	10	5
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	1	6	to	0	1	9
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	10	0	to	0	10	6
Para-amidophenol, hydrochlor	lb.	0	10	6	to	0	11	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	6	to	0	3	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	5	0	to	0	5	3
Paraphenylenediamine, distilled	lb.	0	10	6	to	0	10	9
Paratoluidine	lb.	0	7	0	to	0	7	6
Phthalic anhydride	lb.	0	2	9	to	0	3	0
Resorcin, technical	lb.	0	5	6	to	0	6	0
Resorcin, pure	lb.	0	7	0	to	0	7	3
Salol	lb.	0	2	4	to	0	2	6
Sulphanilic acid, crude	lb.	0	1	0	to	0	1	1
Tolidine, base	lb.	0	6	6	to	0	7	0
Tolidine, mixture	lb.	0	2	6	to	0	2	9

Potash

THE activity which has prevailed in the potash trade during the past few months seems to indicate that farmers are keenly alive to the fact that potash is well worth the price now asked for it. Current quotations for potash salts remain as follows:

			London.
Kainit 14%	(K_2O)	£3 12 6	f.o.r. in bags
Sylvinite 20%	,,	£4 12 6	,, ,,
Sylvinite 30%	,,	£5 12 6	,, ,,
Muriate of Potash 50%	,,	£10 10 0	,, ,,
Sulphate of Potash 90%	purity	£14 10 0	,, ,,

Electro Bleach and By-Products, Ltd.

SPEAKING at the annual meeting of Electro Bleach and By-Products, Ltd., held in Manchester on Wednesday, Mr. A. T. Smith (the chairman) said that the improvement in trade since the beginning of the present year had been sufficiently marked to justify hopes that we had seen the worst. Dealing with the present dispute in the engineering trade, Mr. Smith said the question at issue was fundamental, and he felt that all employers must endorse the action of the Engineering Employers' Federation. The dispute would have an indirect effect on chemical industry if it continued for any length of time.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

GLASGOW, MARCH 16, 1922.

THE market during the week has been variable and sales disappointing. The labour trouble in the engineering and shipbuilding trades has had a depressing effect on business.

Continental dealers have been active and quoting attractive prices. Deliveries from this source are still very slow.

There have been a few more inquiries for coal tar and intermediate products, and some business concluded at rather lower prices generally.

Industrial Chemicals

ACETONE.—Very little movement, but market fairly steady, with a few inquiries; price, £70 to £72.

ACID ACETIC.—Prices remain firm and supplies scarce. Glacial, £56 to £57; 80% B.P., £47 to £50; technical 60%, £33 to £35 per ton.

ACID BORACIC.—Prices remain unchanged at £60 per ton crystal or granulated; £62 per ton powdered.

ACID CARBOLIC (CRYSTALS).—Market steady, but little business passing. Price, 5¾d. f.o.b.

ACID CITRIC.—A few inquiries for shipment. Price, B.P. crystals, 1s. 10½d. to 1s. 11d. less 5%.

ACID SULPHURIC.—Slight local demand. Prices for wagon loads in carboys 144°, £4 per ton; 168°, £7 5s. per ton f.o.r. Dearsenicated, £1 per ton extra.

AMMONIA CARBONATE.—Quoted 4d. to 4½d. per lb. Slight inquiry for small lots.

AMMONIA LIQUID 880°.—Practically no demand, 3d. to 3½d. per lb.

AMMONIA MURIATE (GALVANISERS).—Market firm. No change in makers' price of £34 10s. f.o.r.

AMMONIA MURIATE (SALAMMONIAC).—Another slight reduction in price. Now £60 per ton.

AMMONIA SULPHATE.—Makers' prices unchanged at £15 10s. for 25¼%, £16 13s. for 25¾% neutral. Stocks very low.

ARSENIC.—Prices inclined to be easier at £40 to £41 ex wharf. Very little demand.

BARIUM CHLORIDE.—Continental quotations of £14 15s. c.i.f. U.K. ports.

BORAX.—Crystal or granulated, £29 per ton; powdered, £30 per ton in bags.

CALCIUM CARBIDE.—Price remains unchanged at £20 per ton. In little demand.

CALCIUM CHLORIDE.—Home makers' price remains unchanged at £7 10s. ex quay or station. Continental offers of £6 c.i.f.

COPPER SULPHATE, 99%.—In fair demand, principally for export. Price about £26 15s. to £27 15s. less 5% f.o.b. Liverpool.

FORMALDEHYDE, 40%.—Market still very quiet. Price about £77 to £80 per ton ex wharf.

GLAUBER SALTS.—In very little demand. Commercial crystals about £5 10s. delivered. Cheap Continental offers at £4 c.i.f.

LEAD (RED).—Small local inquiry. Price remains unchanged at £34 10s. per ton ex station.

LEAD (WHITE).—Quoted at £49 per ton ex station, but in little demand.

LEAD ACETATE.—Home makers' prices unchanged. Brown, £33; white, £42 per ton. Continental quotations of £31 per ton for white crystals.

MAGNESITE GROUND CALCINED.—Very little movement. Price, £12 to £12 10s. f.o.r.

MAGNESIUM CHLORIDE.—Spot lots about £8 10s. per ton. Continental offers of £6 10s. c.i.f.

MAGNESIUM SULPHATE (EPSOM SALTS).—Small local demand. Commercial, £9 5s.; B.P. crystals, £10 10s. per ton delivered.

POTASSIUM BICHROMATE.—In fair demand, 7½d. per lb. delivered.

POTASSIUM CARBONATE, 88/92%.—Very little demand. Price, £26 c.i.f. U.K. ports. Spot, £28.

POTASSIUM CAUSTIC, 88/92%.—Little business. Spot lots available at £33 per ton.

POTASSIUM CHLORATE.—Limited inquiry, price inclined to be easier at 5d. per lb.

POTASSIUM NITRATE (SALTPETRE).—Small local demand. Price about 37s. to 38s. ex store.

POTASSIUM PRUSSIATE.—In steady demand. Price, 1s. 2d. to 1s. 3d. per lb.

NAPHTHALENE.—Flakes quoted at £16 per ton f.o.b. Slight inquiry for export.

SODIUM ACETATE.—Price unchanged at £26 per ton. Spot lots to be had slightly cheaper; 76/77%.—Unchanged at £25 10s. ex station. Little demand for this strength.

SODIUM BICARBONATE.—Home makers' prices unchanged at £11 10s. per ton delivered. Continental quotations of £10 c.i.f.

SODIUM CAUSTIC, 70/72%.—Price unchanged at £23 10s. ex station. Resale parcels to be had at £22 10s. per ton.

SODIUM CAUSTIC, BROKEN, 60%.—£26 per ton ex station. Small local demand.

SODIUM CAUSTIC, POWDERED, 98%.—Steady demand for small lots, £29 to £30 ex station.

SODIUM HYPOSULPHITE (COMMERCIAL).—£14 per ton. Pea crystals, £19 per ton ex store.

SODIUM NITRATE.—Makers advise advance of 5s. per ton; 95/96% now £14 15s.; refined, 96/98%, £15.

SODIUM SILICATE 140°.—Unchanged at £12 10s. to £13 per ton ex station. A few inquiries for export.

SODIUM SULPHATE (SALTCAKE).—Some good sales for export at £4 per ton f.o.b. U.K.

SULPHUR.—Government surplus stocks of Sicilian Thirds still to be had at £4 5s. to £4 15s. according to quantity.

WAX, PARAFFIN AND SCALE.—No movement, prices nominal, inquiries unimportant.

WAX, SPERMACETI.—Limited supplies available at 1s. 6d. per lb.

ZINC DUST.—British make offered at £45 per ton carriage paid.

Note.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHOL.—Several inquiries. Price 2s. 9d. per lb., carriage paid.

ALPHA NAPHTHYLAMINE.—A few inquiries for export. Price quoted, 2s. 2d. per lb. f.o.b.

BENZALDEHYDE.—Offered from the Continent at 1s. per lb. f.o.b. Hamburg.

BENZIDINE BASE.—Small inquiry. Offered at 8s. 6d. per lb. on 100% basis, carriage paid.

BENZOL.—Supplies more plentiful and prices lower, at 2s. 2d. per gallon for 90's; 2s. 8d. per gallon for pure, carriage paid.

CHROMOTROPE ACID.—Inquiries both for the Home Trade and for Export. Offered at 13s. per lb., 100% basis, carriage paid or f.o.b.

DINITROCHLORBENZOL.—Inquiries for export. Price lower at £84 per ton f.o.b.

DINITRO NAPHTHALENE.—Inquiries both for the home and for the export markets. Price quoted, 1s. 4d. per lb., carriage paid or f.o.b.

DIPHENYLAMINE.—Some inquiry for the home trade. Price firm at 4s. 3d. per lb., carriage paid.

FLAKE NAPHTHALENE.—Inquiry for export, packed in oak barrels. Offered at £21 15s. 6d. per ton f.o.b.

GAMMA ACID.—Inquiry for export. Offered at 15s. per lb. 100% basis f.o.b.

METANILIC ACID.—Some demand and price firmer at 2s. 6d. per lb. 100% basis, packages extra.

METAPHENYLENEDIAMINE.—Price remains firm, at 6s. 6d. per lb., delivered.

PARANITRANILINE.—Price remains firm at 3s. 9d. to 3s. 10d. per lb., carriage paid.

SALICYLIC ACID (Technical).—Small inquiries. Price quoted, 9d. per lb., delivered.

SOLVENT NAPHTHA.—Market weaker. Supplies offered at 2s. 6d. per gallon, carriage paid.

TOBIAS ACID.—Home inquiries. Offered at 6s. per lb., 100% basis, carriage paid.

TOLUIDINE.—Inquiry for export. Offered at 1s. 11d. per gallon, iron drums included f.o.b.

Manchester Chemical Market

Monthly Report by Sir S. W. Royse & Co., Ltd.

THE better inquiry noted in January has been maintained during February, but business has been more or less spasmodic, and prices, with some few exceptions, have inclined to favour buyers. There has been a good export inquiry for sulphate of copper, but the amount of actual business passing has not been large, although makers have made concessions in price. The Board of Trade figures for January show the exports as 5,513 tons against 6,409 tons for the same month last year. Green copperas is still freely offered at low figures. Supplies of acetates of lime continue small; acetic acid is also scarce and dearer. Acetate of soda has been in steady request, but there has been little call for lead salts, with the fall in the metal.

There has been a rather better demand for carbonate of potash, but fair stocks are held on this side, and the price is practically unchanged. Caustic potash is scarcer and dearer. Muriate and sulphate of potash have more inquiry, and values are firmer. Little is being done in Montreal potashes. A fair amount of business has been put through in yellow prussiate of potash, and the price is firm. Yellow prussiate of soda is still scarce for spot, but second-hand parcels are offering for delivery ahead. There is little change in white powdered arsenic. Business in tartaric acid and cream of tartar has been for near delivery only, and resale parcels of foreign makes are offering freely at low figures. There is also keen competition for orders for citric acid, and price is again lower. Bichromates have been steadily called for, with values unchanged. Oxalic acid has remained dull. Some falling away is perceptible in borax and boracic acid, and prices have been reduced £2 and £5 per ton respectively.

Phosphate of soda is again lower and difficult to sell. Prices for alum and sulphate of alumina have been reduced, owing to keen competition from the Continent. There has been a good export demand for muriate of ammonia and salammoniac, but home trade requirements are small. Bleaching powder has been in increased request for the home trade, but the export inquiry has been quiet. Caustic soda has been in fair demand, and foreign makes are offering at low figures. Deliveries of ammonia alkali and soda crystals are being taken in increased quantities against contracts.

There has been little change in the tar products market. Benzols and toluols are, if anything, somewhat easier. The inquiry for solvent naphtha has again fallen away, and quotations consequently have a lower tendency. Creosote continues without much demand, and the limited business passing has been done at reduced values. Crude carbolic acid remains dull, prices not being sufficiently inducing to encourage makers to extract. Naphthalenes are quiet, refined being practically without demand, whilst fair quantities of crude are being absorbed for firelighter purposes. Pitch retains its firm tone, and Continental business has been arranged at increased values. There is little activity in the home market. Sulphate of ammonia is in fairly good demand, both for home and export, but, supplies being short, stocks are being reserved for the home trade, and consequently little export business is passing.

German Chemical Trade Notes

FROM OUR OWN CORRESPONDENT.

Berlin, March 12, 1922.

THE large increase in coal prices effective as from March 1 cannot fail to have an adverse effect on German Chemical Industry. At present the increase amounts to 133.45 marks per ton, including a duty of 20 per cent. This duty will be increased again on April 1, and the net increase will then amount to from 200 to 250 marks per ton.

Mergers are talked of in connexion with several chemical and dyestuffs undertakings, and already the Badische Anilin u. Sodafabrik has amalgamated with the Bergbau-Aktien-Gesellschaft Lothringen, of Bochum, in order fully to develop the Chemische Werke Lothringen. It is not, at present, known whether the other members of the aniline combine are interested in this development. Another interesting development is the amalgamation of the potash works Leopoldshall, Westeregeln, Aschersleben, and Salzdetfurth. In financial circles the present depreciation of the mark is giving rise to considerable discussion, and it is thought that the announcement of the Reichsbank to the effect that the boom in foreign currency is unwarranted will not prevent a further decline.

A better home and export demand is noticeable, and employment in the textile and glass industries is good.

In regard to the market for industrial chemicals, goods on spot are extremely short and prices have advanced accordingly. Many factories are behindhand with deliveries on contracts owing to the deficiency of railway waggons. Export prices show a tendency to increase owing to the depreciation of the mark. A number of orders from abroad could not be covered for lack of supplies, and contracts have been concluded for delivery in April and May in order to secure goods at all. The market for pharmaceutical products has been very active, with a stiffening of prices. The demand for industrial chemicals holds up remarkably well, and does not come from any particular section; manufacturers and stockholders, however, find it difficult to produce enough to satisfy the brisk demand. Goods on spot are scarce, and sellers are reluctant with respect to offerings. The following quotations are in marks per kilogram (d. = domestic price; e. = export price):

Acetic Acid.—New prices show an average increase of 50%; 80% chemically pure, is 31/32 mk. e.; glacial, 98/100%, 40 mk. e. Benzoic acid, 72 mk. d.; 78 mk. e. Boric acid, 65/68.50 mk. d.; Oxalic acid, 70 mk. d.; goods on spot hardly obtainable. Salicylic acid, 115 mk. d.; 120 mk. e. Alum: Chrome, 15%, 31 mk. d.; 32/34 mk. e.; Alumina Sulphate, 14/15%, 6.50 mk. e.; 17/18%, 8.75 mk. e.; in brisk demand. Bleaching Powder (35/37%), 11.50 mk. e. Borax, crystallised, 31 mk. d. Calcium Chloride, 70/75%, 4.75 mk. e.; 90/95%, 5.50 mk. e. Potash Carbonate, 80/84%, 18 mk. d. 90/95%, 19 mk. d.; 96/98%, 24 mk. d.; 28 mk. e. Potash Caustic, 88/92%, 25.50 mk. d.; 29.50 mk. e.; liquor, 50° Bé., 13.50 mk. d.; 18.50 mk. e. Potash Chlorate, 26 mk. d.; 30 mk. e. Soda, Caustic, 125/128°, 26.50 mk. d.; 25 mk. e.; liquor, 38/40° Bé., 8.85 mk. d. Soda Sulphide, 30/32%, 11/12 mk. d.; 60/62%, 16/18 mk. d.; Zinc Chloride, 15 mk. e.

The market for coal tar products has been exceedingly active, and demand from inland and abroad is well maintained. Sellers intimate that supplies are inadequate. Owing to impending price increases, consumers are inclined to take up what they can get, and occasionally prices were sharply advanced on spot. Quotations are as follow:

Benzaldehyde, 58 mk. d.; 65 mk. e. Brown Coal Tar, 125/220 mk. per 100 kg., according to quality, ex works. Carbolineum, pure, 4/4.20 mk. Coal Tar, distilled, was in brisk demand and fair business was passing at 3.50/3.70 mk.; prepared, 3.30/3.45 mk. Naphthalene, pure, in flakes, 12 mk. d.; 15 mk. e.; in balls, 14 mk. d.; 16 mk. e. Tar Residues, little interest shown, and prices are 50/80 mk. per 100 kg.

The situation in regard to paint materials is much the same as last week. The principal quotations are:

Bone Glue, 41 mk. d. Lead: Red, 29.50/31 mk. d.; 34 mk. e. Lead, White, powdered, 32 mk. d.; 35 mk. e.; in oil, 31 mk. d.; 33 mk. e.; Sugar of Lead, crystallised, 28.50 mk. d.; 31/34 mk. e. Litharge, 29.80/31 mk. d.; 33 mk. e. Lithopone, red seal, 14/16 mk. d.; 19 mk. e. Skin Glue, 54 mk. d. Strong Glue, 41 mk. d. Vermilion, 410 mk. d. Zinc White, red seal, 29.75 mk. d.; 36 mk. e.

French Production of Synthetic Ammonia

FOUR amendments to the Bill concerning the contract concluded on November 11, 1919, between the French Government and the Badische Anilin u. Sodafabrik Co., relating to the Haber synthetic ammonia process, have been submitted to the Chamber by M. Loucheur. He proposes the cession of this contract to private undertakings without allowing them any Government subsidies. In the event of no company offering to co-operate M. Loucheur suggests the establishment of State factories, the working of which would be entrusted to private enterprise under State supervision. In any event, according to M. Loucheur, both the Claude and Haber systems would be used. The capital required is said to amount to 120 million francs, of which 30 millions would be required in the present year.

Organisation of Scientific Workers

MAJOR A. G. CHURCH, general secretary of the National Union of Scientific Workers, gave an address on "The Organisation of Scientific Workers" at a meeting held on Monday in the Technical College, Glasgow, Professor Moncur presiding. The lecturer said scientific research was not yet appreciated in this country, and it was the fault of scientific people themselves, who were not sufficiently well organised. One of the principal functions of the Union was to create a demand for scientific men in order to get minimum salaries established. They had to bring home to manufacturers the need for scientific workers in their establishments.

Company News

MORGAN CRUCIBLE CO., LTD.—The transfer books are closed from March 17 to 31 inclusive for the preparation of dividend warrants.

LEVER BROTHERS, LTD.—The transfer books for the 7 per cent. first mortgage debenture stock are closed from to-day (Saturday) to March 31.

MAGADI SODA CO., LTD.—The debenture transfer registers are closed from March 16 to 31 inclusive for the preparation of interest warrants payable on April 1.

ROSARIO NITRATE CO., LTD.—A dividend of 20 per cent., free of income tax, payable on March 16, was declared at the annual meeting held in London on Wednesday.

AMALGAMATED GLASS BOTTLE WORKS, LTD.—A resolution providing for the voluntary liquidation of the company was carried at an extraordinary general meeting held in London on March 10.

SALT UNION, LTD.—The date of the annual meeting has been changed from March 22 to March 29. The transfer books for the ordinary and preference shares are closed from March 13 to 29 inclusive.

JOSEPH CROSFIELD & SONS.—The accounts for the year to November 30 last show, after charging repairs, renewals and alterations, depreciation and insurance, a balance at credit of profit and loss of £280,556. A dividend of 5 per cent. will be paid on the ordinary shares for the year, leaving to be carried forward £3,056.

UNITED TURKEY RED CO., LTD.—A net loss of £199,700 against a profit for the preceding year of £131,216, is shown in the report for 1921. After allowing for preference dividends and £53,295 brought in, there is a debit at profit and loss of £188,469. £200,000 has been transferred from reserve, and £11,531 is carried forward.

WILLIAM GOSSAGE AND SONS, LTD.—The balance-sheet fo the year ended November 30, 1921, shows a balance at credit of profit and loss of £148,835, which has been appropriated as follows :—Dividends on 5 per cent. first cumulative preference shares, £22,500 ; on 6½ per cent. cumulative preference shares, £48,750 ; on ordinary shares at 15 per cent., £75,000 ; balance carried forward, £2,585.

JOHN OAKEY & SONS.—Including £4,116 brought in, the net profits for 1921 amount to £8,957. After paying the preference dividend and transferring £5,000 from general reserve, the directors recommend the payment of a dividend of 2½ per cent., less tax, on the ordinary shares, carrying forward £1,717. The transfer books will be closed until March 22. The annual meeting will be held at Winchester House, London, on March 22, at noon.

DOMINION TAR AND CHEMICAL CO., LTD.—Particulars relating to the company have been published for public information only. The share capital is £300,000 in ordinary shares of £1 each, of which 200,000 shares have been issued and are fully paid, and 50,000 shares were recently issued at par, of which 2s. 6d. per share has been paid. The company was incorporated in 1903 to carry into effect an agreement with the Dominion Iron and Steel Co. to carry on the business of tar distillers and chemical manufacturers in Canada.

Corrosion of Metals

AT a meeting of the Yorkshire Section of the Society of Chemical Industry on Tuesday, Dr. Rogers, in a paper on the "Corrosion of Metals," said that sometimes a small cavity was produced in the surface of a metal by corrosive action, but it was often difficult to find the original cause, since if it were a locally defective spot, it was obliterated together with the metal surrounding it. He traced the influence of moisture, which usually occurs as drops when condensed from the atmosphere, and of dust in starting corrosion, and discussed the methods by which he rapidly tested the resistance of metals to acid action. Dealing with an ancient wrought-iron pillar at Delhi, he suggested that one reason why it never rusted might be the almost ceaseless slight sand-blasting action of the dust carried in the atmosphere. He made a laboratory investigation to study this action, which he thought he might be able to apply as a basis of a new test in the development of new steels and alloys for resisting corrosion.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. NO.
Canada	Perfumes, soap, powders, &c.	275
France	Soap and candle materials	280
Hungary	Chemicals, colours, coal tar products	283
London	Rape oil	—
Canada	Oils and grease	—
Cape Town ..	Paints, white lead, disinfectants..	301
Nantes	Sulphate of copper	308
Norway (Stavanger)	Copra and linseed oil.....	314
Sweden (Norrköping)	Dyeing machinery. .	317

Tariff Changes

ITALY.—Charcoal, petroleum, and petrol may now be exported without the requirement of an export licence. A licence is not now required for the importation of dyes for chemical laboratories, for pathological and similar purposes. The price fixed for the first half of March for certificates for payment of Customs duties is 392 lire for 100 lire gold.

GERMANY.—The premium leviable when the "gold" duties of the Customs Tariff are paid in paper currency has been increased, as from March 1, from 3,900 to 4,400 per cent. As a consequence, 4,500 paper marks (instead of 4,000 paper marks as hitherto) have to be paid for each 100 marks "gold" duty leviable under the Customs Tariff.

NEW ZEALAND.—It has been decided to apply the special depreciated currency surtax to glass bottles and glassware, and to perfumed spirits where the duty levied is an *ad valorem* one.

MOROCCO (FRENCH ZONE).—A list of goods the exportation of which is prohibited includes wood charcoal, and tanning extracts of vegetable origin.

FRANCE.—Dephosphorisation slag may be exported or re-exported without special authorisation until further notice.

TANGANYIKA TERRITORY.—Natalite may now be imported free of duty.

Chemical Trade Wages Dispute

THE strike of South Wales chemical workers, whlch entered upon its third week on Monday, has not affected the Welsh tin-plate trade to the extent that was feared. It was thought that it would result in supplies of acid to the works being stopped, and that in consequence tin-plate production would have to be suspended for a time. So far from acid supplies having been stopped, some works state that they have the requisite quantity assured for at least six weeks. Not one tin-plate works has thus far been held up on account of lack of acid, although developments may occur in regard to the acid supplies which are coming into the affected area. Mr. D. Bonham, the South Wales district secretary of the chemical workers, stated on Monday that a meeting had been convened of chemical and tin-plate workers in order that the position brought about by this influx of acid may be dealt with.

Fire at a Chemical Works

CONSIDERABLE damage was caused by a fire on March 11 at the chemical works of Josiah Hardman, Ltd., Milton, near Stoke-on-Trent. It occurred in the pitch bay, into which boiling pitch was flowing from a cooling-tank. From some cause not definitely known, a slight explosion occurred, which led to the ignition of the pitch. The bay, which contained nearly 500 tons of set pitch, was soon a mass of flames, but the efforts of two local fire brigades resulted in the suppression of the fire in a little over an hour. Fortunately the pitch bay is almost completely surrounded by water and the wind was blowing away from the main buildings at the time, otherwise the material damage might have been very much more extensive. No lives were lost.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

JAMES, Henry. P., Medical Hall, Tenby, chemist. £10 5s. January 13.

LLEWELLYN, W. M., Dunraven Street, Tonypandy, chemist. £21 5s. 2d. January 13.

NICHOLSON, J., 334, Sherrard Road, Manor Park, chemist. £20 7s. 2d. January 5.

SULLY, John, & CO., 14A, Leytonstone Road, Stratford, chemists. £10 3s. 4d. January 12.

THOMAS, T. E., George Street, Llandilo, chemist. £16 5s. 8d. January 6.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

ANGLO-LITHUANIAN OIL WORKS, LTD., London, E.C.—Registered February 27, £6,420 and 250,000 German marks, debentures; general charge.

CELLON (RICHMOND), LTD., London, W., manufacturers of dopes, varnishes, &c.—Registered February 28, £10,000 debentures; general charge. *Nil. December 31 1920.

DERBY FERTILISERS, LTD.—Registered March 4, £1,500 debenture, to Branch Nominees, Ltd., 15, Bishopsgate E.C. *Nil. January 5, 1922.

ELLIOTT BROTHERS, LTD., Southampton, cement and lime manufacturers.—Registered February 14, £10,000 debentures; general charge; also registered February 14, charge to bank. *Nil. May 24, 1921.

FIELD (J. C. & J.) LTD., London, S.E., soap and candle manufacturers.—Satisfaction registered March 4, £20,000, part of amount registered. June 27, 1917.

PARR'S DYE AND CHEMICAL CO., LTD., Manchester.—Registered March 1, £1,000 debentures; general charge.

PREMIER COP DYEING CO., LTD., Heywood.—Registered March 1, deed of indemnity, to managing director, securing the amount (if any) which he may have to pay to the company's bankers to redeem his securities; general charge. *£400. April 5, 1921.

VICTORS, LTD., Manchester, chemical manufacturers.—Registered March 6, £100 and £500 debentures, part of £35,000; general charge. *£3,500. March 7, 1921.

London Gazette

Company Winding Up

ALBY UNITED CARBIDE FACTORIES, LTD. Winding up order, March 7, 1922.

Companies Winding Up Voluntarily

CENTRAL ACID CO., LTD. T. J. Davies, of Seaton Carew, appointed liquidator. Meeting of creditors at Seaton Carew, co. Durham, on Monday, March 20, at 11.30 a.m. Particulars of claims by April 12, the liquidator.

OPHTHALMIC & CHEMISTS' SUPPLY CO., LTD. D. Roth, of 13, Old Burlington Street, London, W. 1, appointed liquidator. Meeting of creditors at the offices of the liquidator, 13, Old Burlington Street, W. 1, on Friday, March 24, at 12 noon.

Liquidators' Notices

GORDON, H., LTD. Particulars of claims by April 10, to A. E. Tilley, of 8, Staple Inn, Holborn, the liquidator.

GRAHAM, ALEX., & CO., LTD., in voluntary liquidation. Particulars of claims by April 22 to C. M. Skinner, of Jones, Crewdson and Youatt, 7, Norfolk Street, Manchester, the liquidator.

Bankruptcy Information

HUSSON, Ernest, 4A, Ashland Place, Paddington Street, Marylebone, London, W. 1, and 80, Valnay Street, Tooting, S.W. 17, Lead, Glass, Oil and Colour Merchant. Receiving order, March 7, debtor's petition. First meeting, March 21, 11 a.m., and public examination, May 5, 11 a.m. Bankruptcy Buildings, Carey Street, London, W.C. 2.

TESORIERE, Joseph John, trading as THE CANAL GLASS BOTTLE CO., at the Canal Glass Works, Verney-Road, Bermondsey, London, S.E., 16, late 25 to 31, Shard's Road, Peckham, London, S.E. 15. Glass bottle manufacturer. Receiving order, March 9. Debtor's petition. First meeting, March 22, 12 noon, and public examination, May 16, 11 a.m. Bankruptcy Buildings, Carey Street, London, W.C. 2.

Edinburgh Gazette

AYRSHIRE CHEMICAL CO., paint manufacturers, West End Works, Dalry, Ayrshire. Firm dissolved, of mutual consent, January 31, 1922. Debts received and paid by Mitchell & Smith, 163, West George Street, Glasgow.

STEVENSON, Archibald Stewart, 86, Eveline Street, Dennistoun, Glasgow, late manufacturing chemist. Meeting of creditors in this sequestration, chambers of Hardie, M'Farlane and Boyd, 153, St. Vincent Street, Glasgow, on Tuesday, March 28, 1922, at 3.

New Companies Registered

HENRY SMITH & CO., LTD., 55, Market Street, Manchester. Chemical manufacturers and merchants. Nominal capital: £6,000 in £1 shares.

HUGOHUTTE CHEMICAL WORKS, LTD, 62, London Wall, London. Manufacturing chemists. Nominal capital: £8,500 in £1 shares.

MACKINTOSH BROTHERS, LTD., Grand Theatre, Putney Bridge Approach, Fulham, London. Vinegar brewers, mineral water manufacturers, &c. Nominal capital: £15,000 in £1 shares.

POUND TAYLOR & COLLEN, LTD. The Roller Mills, Melksham, Wilts. Dealers in fertilisers, &c. Nominal capital: £75,000 in £1 shares.

SEYCHELLES GUANO CO., LTD., 5, Raymond Buildings, Gray's Inn, London. Dealers in guano, &c. Nominal capital: £1,000 in £1 shares.

SHAW CHEMICAL CO., LTD., The Public Wharf, Belgrave Street, Leicester. Manufacturing chemists and manufacturers of shoe and leather polishes and stains. Nominal capital: £2,000 in £1 shares.

Chemical Education in Belfast

MR. MARLOW, assistant secretary of the Institute of Chemistry, who has been in Belfast to discuss with the educational authorities the question of making the Municipal College of Technology a centre at which students could work for the diploma of the Institute, was the guest of the Belfast section of the Institute of Chemistry at a luncheon at Thompson's Restaurant on March 6. Mr. Marlow pointed out that this was the first official visit of a representative of the Institute to Belfast; he hoped the present negotiations would be successful, and thought that such an arrangement would do much to promote the cause of sound chemical education in the city. Among those present were Major R. Stanley, Principal of the Municipal College of Technology, Messrs. S. T. Mercier, and J. H. Totton.

British Glass Bottles

IN connexion with our review of the exhibit at the London Section of the British Industries Fair of John Dowell & Sons (Glass Bottle Manufacturers), Ltd., we are informed by the firm that none of their bottles are made on automatic machines, and that they were, in fact, exhibiting their lung-blown bottles in competition with the automatic machine made article.